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INDUSTRIAL-ARTS MAGAZINE

Vol. VIII DECEMBER, 1919 No. 12

THE GETTING TOGETHER OF EDUCATION AND INDUSTRY

James McKinney, University of Illinois

Education and Industry Among Primitive Peoples.

AMONG primitive peoples education consists very largely in preparing young folks to take their part effectively in the struggle of meeting the economic problem of their life. The education of the young Eskimo, for instance, consists in house making, dress making, making the weapons of hunting, and providing all the simple furnishings that make up his household. Here the people have no quarrels among themselves about educational values of various kinds; they are little concerned about the cultural values of these activities, and yet they have their folk songs and dances and a simple philosophy of life. They simply take these things as they come, and in the process of doing this, they have developed certain crude ideas of culture and art and science. As John Dewey has rather truly said, "The chief difference between savagery and civilization is not in the naked nature which each faces, but the social heredity and social environment," and therefore, those of us who have tasted the sweets as well as the bitters of modern civilization do not want to go back to this primitive stage of living. There is, however, a real need for us again facing this large problem of bringing education and life together in some more vital way.

The Function of Education.

We ought to ask ourselves continually, What is the purpose of all this activity, of all this struggle and sweat of industry? What is the function of the school and education? We have had many definitions with regard to this. Educators have told us that education is merely a matter of a human being adjusting himself to his environment. They have told us, it is the well-rounded development of all the faculties; a healthy mind in a healthy body. They have claimed that education's chief function is to teach us how to behave, or to prepare us for efficient living and a high sense of our social obligation; or again, it is the process of the elimination of waste; and so on, we might add a great variety of definitions with regard to the process or function of education.

The Basic Idea of Industry.

In studying the daily life of primitive peoples, we get a truer conception of the real basic idea of industry. In the simpler forms of civilization industry shows up very clearly in its function of supplying real social needs. In a primitive society people work very largely to supply the human needs of food, clothing and shelter.

In the early stages of industry each man worked to meet all these three needs for himself and those who may have depended on him. Gradually as people began to learn the value of cooperation, one man specialized on the food question, another on the housing problem, and a third on the clothing problem, and they in turn exchanged the products of their labor. From this method of barter and exchange of life's needs we gradually evolved into the other idea of selling our services.

The Coming of the "Middlemen."

The inconvenience of this method of barter and exchange of goods developed the modern idea, of the time saving and efficient mode, of exchange of service thru money. Money after all is merely the symbol or token of the value of so much work or service. To meet the growing demand of a more abundant life, a life with an abnormal appetite for the luxuries of food, shelter and clothing, the necessity of the middle man or merchant became evident. Here a new member in this society of workers was introduced. He did not toil or make things himself, but he worked hard in gathering the commodities of life, to make them of easy access to those who demanded these goods. He explored the whole earth in his search to find enough goods to provide for the present wants of people, or to discover new goods and thereby create new wants, or find new markets for his surplus production. We have yet to fully realize the power for good and evil thru this great modern social function of commerce. We have yet to realize how much it is responsible for the continual carving, and dividing up of kingdoms.

Thru the efforts of this man of commerce the products of even the isles of the sea are laid at our door, and if we only have the money to pay the price, every whim and caprice of extravagant living can be supplied. This convenience, however, brought with it also a curse, as men very rapidly seemed to lose sight of the fundamental idea with regard to work and industry. With a man, who is gathering the products of one group of people and then selling them to another group of people, there grew up all kinds of opportunities for the cornering of these commodities. There also developed the selfish and unsocial practice of selling certain things for the monetary return even tho they worked harm on society. The slave trade, the opium trade are outstanding examples of this practice. In this manner industry very soon began to have as its function, not that of rendering of service in the way of producing food, shelter and clothing for people, but rather a means for piling up wealth and power, a race in which each man looked after himself, and the prizes were only for the

swift, the unscrupulous and the strong. While industry today is still doing a great service in supplying our needs in a bountiful and luxurious way, it still has, in many places, uppermost in its mind the idea of wealth and power. The industrial history of the nineteenth century is a wonderful story of how the human mind wrestled and sweated in its efforts to conquer the great scientific truths of the world and applied them to industry. The nineteenth century is the age of invention, the period in which the machine and the tool in all their power were developed for the benefit of mankind. However, there is another side to this story. Our histories, if they speak the truth, will also tell of a period of extravagant waste of natural resources, and a still worse tale of a terrible and heartless exchange of human life for dollars. A large number of those who have gained the prizes in the race for power and wealth have attained their position largely because they have robbed their fellow workers of an opportunity to grow and a fair share of "the spoils."

Educational History.

Parallel with this wonderful development in the industrial world there has been going on an equally wonderful growth of the finer instincts of men's natures. The worth of human life has been fully brought to view. The great philosophies and religions have had their birth and growth. Literature and art have grown from the crude beginnings of the savage peoples' songs, dances and decorations into the glories of our grand opera, sculpture, painting, and architecture. The one disturbing element in the development of these two huge forces, of education and industry has been the fact that while they have developed together, they have developed apart from each other with no common interests.

Very early in the history of the development of culture, Greek philosophy preached a gospel which set up a great barrier between education and industry. Its teachings divided people into two large groups; those who worked with their hands, producing the necessities of life; and another group, a superior group, in their mind, who thought out the great philosophic truths of life. The great philosophers sincerely thought and believed in a philosophy which separated education and industry by an inseparable wall. The man who thought about life's problems could not contaminate these by working with his hands or helping to supply physical needs. This philosophy believed that the other half, the workers or barbarians, existed solely for the benefit of this cultural class so as to provide them with the necessary leisure and freedom from the contacts of debasing work. It is not surprising then to find that education on the whole has been influenced very much by this philosophy. Schools and colleges, even as late as the middle of the last century, were devoted exclusively to the idea of education for a selected group of people, and that higher education as they saw it, was unnecessary for the workers.

The Entering Wedge of the Practical and Social Idea in Education.

It was only thru the coming of the Baconian idea of the study of the sciences, and the fact that steam and electricity were transforming industrial methods, that education was forced to change its policy from political to social service, and fit its curriculum to the new idea of specific rather than general education. Among the early efforts in this line was the introduction of physics and chemistry in the school studies. The other great force which brought to the world's eyes how wrongly labor had been treated was Carlisle and his great gospel of work. From this period on to the present day there has been a gradual creeping into education more of the idea of education having a real hand in the practical affairs of life.

Education and Industry on Opposite Sides of the Fence.

However, with this long standing difference in ideals between education and industry there has developed a misunderstanding which is very difficult to overcome. Education has, and rather truly, accused industry of being sordid and low in its motives. On the other hand, industry also somewhat truly has accused education of being separated entirely from life, impracticable, and visionary in its point of view; its teachers, as people who have taken themselves apart from life and only look at it thru a telescope. Industry has been continually telling education that its product is a failure; that it does not give it the kind of person that industry wants. On the other hand, education has just as strongly told industry that it will not sacrifice its ideals to turn out a cog for a machine.

Industry has asked education to give it a person who can read, write and figure accurately, and their tests have been in the practical things of life. According to industry, the percentage of failures in this test have been so high that industry has challenged education in not doing its work efficiently. On the other hand, it is also claimed that education has failed to deliver the person with some of these qualities of honesty, loyalty and a high sense of duty. Industry has been so dissatisfied with the product of education that we now even hear it say, "if you will only give us a person free from some of the worst human frailties, we will do the educating and training ourselves."

As long as employers have kept thinking of labor as a mere commodity; something which can be bought and sold, something which could be used up and thrown on the scrap heap, it has been impossible for education and industry to get together; however, out of the many social disturbances which we have been having in recent years, and the light which the great war has shed on our industrial problems, employers are beginning to see labor and labor's problems in a new light. The captain and the privates are at last beginning to see each other in a right relation.

The New Industrial Problem of the Twentieth Century.

The great problem for industry to solve in the twentieth century will be the great problem of human

relations. Industry is at last beginning to see that it must treat its workers with much more thought than that of a mere commodity, if industry is to live at all in its present organization.

The disturbing elements of unrest and dissatisfaction on the part of the workers have brought the captains of industry face to face with this great problem, that of actually cooperating with the workers and giving them some real share in the affairs of industry. The laborer's cry for better treatment has been long and bitter and he has learned the value of cooperation in forcing his demands. Thru his efforts in a cooperative way he has brought about better housing, better education for his children, shorter hours, compensation for injury, better food and shelter for himself and family; but even all this does not satisfy, and the laborer's problem will never be solved on the basis of mere shelter, shorter hours and higher wages. What he really craves for, after all, is a share in the management and solution of the problems concerning this thing by which he earns his daily bread. A number of attempts are being made to bring the worker and industry together in a real cooperative way. Plans are now being worked out and many experiments are now being tried by large corporations in an effort to give the worker a share in the management and a fairer share in the profits of industry. However, no matter how good the intention of industry may be in this matter. ignorant men, we will not have solved the problem but will have merely added anarchy to the present disturbing elements. Therefore, in the getting together of employer and labor, they need the third great factor of education. Education can really lend a very helping hand in this problem, and it is fortunate that education thru its own struggle for the democratic idea is now fairly well prepared to meet labor and the employer on a common ground.

Education has also seen wherein it was narrow and undemocratic in its purpose and has been making valiant strides during recent years to really serve the worker as well as the merchant and the professional man. It is thru the new movement of vocational education that industry and education can meet on a common ground and again bring back into life, only on a much higher plane, that idea in primitive life where education and industry were tied together in a common problem of meeting all the needs of a man's life.

Getting Together.

The need for trained workers has become so pressing in industry that industry is making some efforts on its own account to train workers to meet this demand. In carrying out this work it has taken up the methods of the school to perform it, and we now have in many of our large corporations schools established for the purpose of training workers to meet their own production needs, and in some cases real efforts are being made to actually prepare these workers for better citizenship. It could not be expected that industry should do a real high-grade piece of work in this connection altho they have made good progress. The great weakness in a number of our corporation schools has been the narrowness of their aim, and the lack of real teaching ability on the part of many of the people who are doing the instructing.

Education can therefore help industry by first helping to provide industry with trained instructors and foremen, that is, men and women who have the instructor's point of view. There is no other existing agency that can do this job as well as education. The war has demonstrated that education can help in this matter, and the war has further demonstrated that it pays to give this training. Foremen and other executives need to get the point of view that they are educators as well as producers.

For a large number of young people their work is also their only field of education, and the writer thoroly believes that learning to do any form of work seriously, skillfully and with intelligence is a part of the educational process. Industry in its fight for wealth and power has lost sight of this factor, and education has only recently begun to see ways and means for carrying out this neglected and important piece of work.

The Program of the Federal Board for Vocational Education.

The whole program of the Federal Board for Vocational Education is centered around the welfare of those who thru various reasons have been forced to go to work during the adolescent period of their lives. Schools and classes are being established for the one purpose of making these unfortunate workers more proficient industrially, giving them a larger outlook in life and a taste of the economic independence that comes to educated people. This wonderful program of education for the workers of our country, however, will fall short of its great possibilities unless education and industry get together in this common problem.

Education must be ready to see and to seize upon the educational opportunities that exist in industry and use them to the fullest extent. It must stop calling industry sordid and selfish, and try to lead industry to see even in the voice of the machine and the barter of the market place some of the possibilities for cultural growth and spiritual insight. It must prove to industry that it will mean increased dividends in dollars and cents, in better service, and better understanding, to educate its workers; and further, education must get the worker to see that in his round of hard honest toil there is an avenue of approach to a better economic living and an appreciation of the finer things of life. If this job is to succeed, education must be sincere. Any half-hearted help will be doomed to failure. To use this idea of vocational education for any other purpose than that which its clear aim states will be to help defeat a great cause. When children have been lured to school with the idea that vocational education was going to be something different, something that would really interest them, and then discover the same old stone for

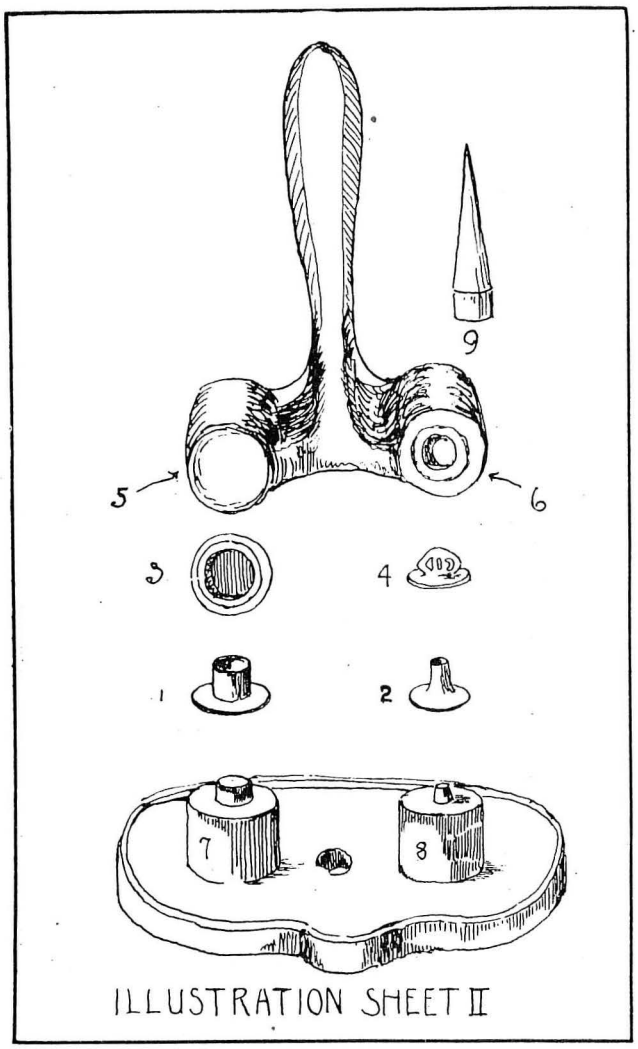


ILLUSTRATION SHEET II

A mark of identification is often desirable and adds to the beauty of the problem. Well designed and executed monograms serve this double purpose. Select monograms which contain simply formed letters in pleasing legible arrangement. These may be cut from binder's cloth and pasted to the surface in some well chosen space.

No one but a teacher of handwork knows what accuracy on the part of the maker will do for such problems as are outlined here. It is enough just to remind one that well executed work is what will make the gift respectable in appearance.

The construction of any one of the suggested problems is a long process. The skillful teacher will find ways of dividing the work into convenient periods. Investigation will show that this may be done very easily.

Clear and concise directions are very essential. For this reason the directions as used by the author in his classes are given in detail.

Problem I. Portfolio

May be used for carrying sheet music.

Materials:

2 pieces binder's board, 11″ x 14″.
2 pieces binder's board, 10″ x 14″.
2 pieces cover paper, 9″ x 13″, facing inside of pockets.
2 pieces cover paper, 10″ x 13″, facing outside of pockets.
2 pieces cover paper, 9½″ x 14″, lining small board.
2 pieces cover paper, 10″ x 14″, lining large board.
2 pieces binder's cloth, 4″ x 36″, fulness in pockets.
1 piece binder's cloth, 4″ x 30″, hinge.
1 piece binder's cloth, 1½″ x 28″, binding.
2 pieces binder's cloth, 3″ x 6″, flaps.
2 complete fasteners.

Processes: Binder's cloth 4″ x 30″. Cut into two pieces 4″ x 17″ and 4″ x 13″.

4″ x 17″—Lay cloth on desk with long edges running horizontally. On wrong side measure in 1¼″ from upper 17″ edge at both ends and at the middle. Draw line thru these dots. Go thru same process below. See Fig. II, Sheet I.

Draw line 1½″ from narrow edge (right). Repeat at left. Apply paste to upper long rectangle. Lay one board 11″ x 14″ in this rectangle as suggested in Fig. III. Paste other board of same size in lower rectangle.

Paste cloth 4″ x 13″ (wrong side down) over the first piece of cloth and the edges of the boards as shown in drawing. Press this down into place with ruler. Turn over the extending ends and paste down as shown in Fig. IV.

Directions for Making and Attaching Flaps.

Flaps—cloth 6″ x 6″. Cut into two pieces 3″ x 6″. Draw line down center long way. Fold each long edge to line. Unfold—long edges vertical. Measure up ¾″ from lower edge on each side. Draw line. Cut away small corner square, Fig. V. Fold remaining squares on diagonal line. Fold back long side rectangles and paste. Punch hole where four corners meet.

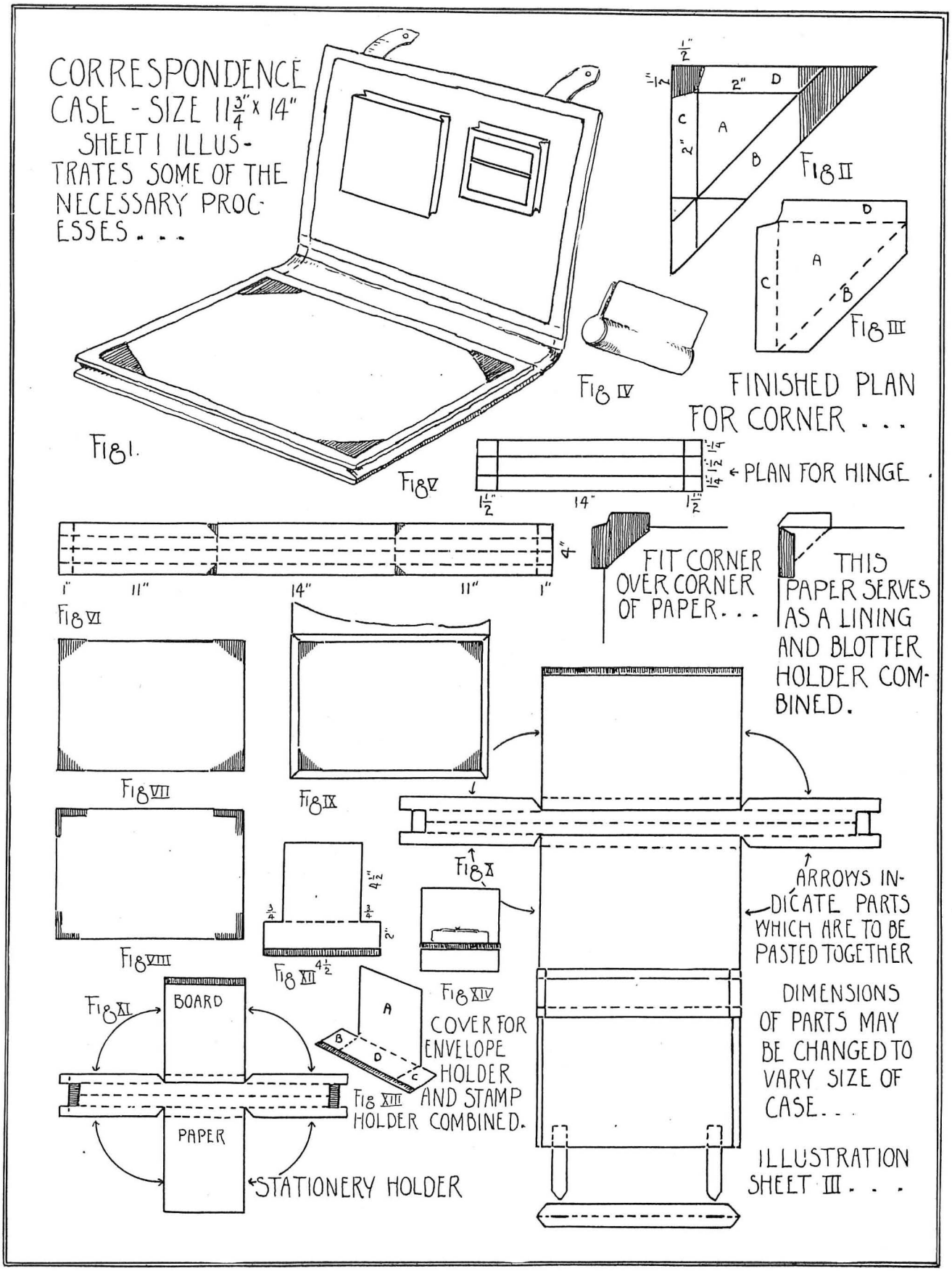
Figure VII, Sheet 1, suggests cutting away some of the board so that the face of the material used in the flap will be flush with the face of the board. Same drawing gives necessary measurements. These flaps should be pasted to board as suggested in Fig. IV, and passed thru binding at point indicated by heavy lines, Fig. X.

Paper 10″ x 14″.—The inside of portfolio is side which shows the joint in the hinge. Use this paper to line the inside of boards 11″ x 14″. Let lower edges of paper and boards coincide and the upper edge of paper cover edge of cloth. Fig. IV illustrates this. The darkened portion represents board, the broken surface represents paper.

Boards 10″ x 14″.—Cloth 1½″ x 28″. Cut cloth into two equal pieces 1½″ x 14″. Bind one long edge of each board with this cloth folded the long way down the middle.

Paper 9½″ x 14″.—Line these boards with this paper. Fix. IX suggests method.

Cloth 4″ x 36″.—Fold down the middle, the long way, right side in fold. Fold each long single edge back to closed edge. Unfold. From one end (narrow edge) on long edge measure in 1″. From that point measure on 10″. From that point measure 14″. From that point measure 10″ and from the last point 1″. Repeat these measurements on other long edge. Fig. X gives necessary illustration. Draw lines thru corres-



ponding dots (above and below). Cut away small triangles suggested in drawing. Make slits indicated by heavy lines in one piece only.

Figure XI, shows how to hold the cloth when shaping the part giving fulness to pocket. Push end of cloth represented by upper part of drawing into end of lower part. This operation will produce something like what is represented in Fig. XII. (When working with

children it is a good thing to carry out this operation in paper as a preliminary step.)

Figure XIII shows how to treat each end of the cloth. Paste down small parts indicated by darkened surface. Cut away irregularly shaped figure when assembled, and turn the small extending square down inside pocket and paste.

Figure XIV shows how to assemble the parts to form one pocket. Assemble and paste other pocket in same way. Put flaps thru slits cut for them. Fig. XV represents the finished problem.

Fasteners may be secured from most school supply houses or they may be bought direct from the manufacturer.

Attaching the Fasteners.

The necessary operation for putting on these fasteners is illustrated on Sheet II. The various parts are represented in the order in which they should be used. Besides what is represented here a common eyelet punch is necessary.

Processes: Punch hole where button is to be placed. Fit 1 over upper part of 7. Place lower part of cone (9) in upper part of 1 and force material down over cone on to 1. Remove cone. Place 3 over 1. Place 5 over 3 and strike with hammer. This forces 1 and 3 together and forms the button.

Go thru the same order of operation for putting in fastener using 2 on 8—4 on 2 and 6 on 4. (The cone is not used here.)

It is a good plan to put button on flap first. Then mark place for fastener by pressing down on button at the place where fastener should be. Always put in fastener at most convenient time.

Problem II. Correspondence Case.

Materials:

3 boards, 11″ x 14″, foundation of case.
1 board, 6″ x 7″, stationery holder.
1 board, 5″ x 5″, envelope holder.
2 cover paper, 10½″ x 14″, lining pocket.
4 cover paper, 10″ x 13″, facing.
2 cover paper, 6″ x 7″, stationery holder.
1 cover paper, 5½″ x 6½″, stationery holder.
1 cover paper, 5″x 5″, envelope holder.
1 cover paper, 6½″ x 6½″, envelope holder.
1 cloth, 4″ x 38″, fulness in pocket.
1 cloth, 4″ x 30″, hinge.
1 cloth (cut as needed), 1½″ x 50″, binding.
1 cloth (cut as needed), 4″ x 8″, corners.
1 cloth (cut as needed), 6″ x 6″, flaps.
1 cloth, 3″ x 22″, fulness for paper.
1 cloth, 3″ x 17″, fulness envelope holder.
1 cloth, 1½″ x 11″, binding.
1 blotting paper, 9¾″ x 12¾″.

Many of the processes used in making this problem are identical with those described in the directions for Problem I. Watch for variations in dimensions.

Refer to drawings and directions for Problem I, when bringing covers and making pocket. The pocket in this case is 11″ x 14″.

Corners.

Use 4″ square cut from cloth 4″ x 8″, fold on diagonal and cut.

Use one triangle for each square. Measure down ½″ from top on left edge. Measure down ½″ from top near right near right end of line,—draw line thru these dots. Fig. II, Sheet III. To the right of left edge on top edge measure in ½″. Do the same near the lower end of the edge. Draw line.

From the intersection of these two lines measure 1½″ to the right on the horizontal line.

From the intersection of the two lines measure down 1½″ on the vertical line.

Draw a line thru these parallel lines to the diagonal edges.

Down from the intersection of the horizontal and diagonal line draw a line at right angles to the horizontal line.

To the right of the first vertical line at the point where it intersects the diagonal line, draw a line at right angles to the vertical line.

Cut away darkened portion indicated in diagram. Cut away similar part below.

Small square at corner. Notice the small portion in lower righthand corner which has not been darkened. This must be left in order to prevent the material underneath from showing thru. Fig. III, Sheet III, shows a pattern for corner.

Fold b under a and paste. Fold c and d under a but do not paste. The material on which these are to form corners is slipped in between these parts (c and d) and a, and c and d are pasted to this material.

Figures VII and VIII—Show how these corners are pasted over lining paper to form blotter holder.

Figure IV, Sheet III—Suggests a way of making a pencil holder. Paste rectangular pieces together and paste under blotter holder.

Figures XIV—Stationery holder—assemble as suggested. Dimensions are indicated. This pocket is made in the way other pockets were made. Envelope holder made in same way. Cloth is measured as follows: 1″-5″-5″-5″-1.

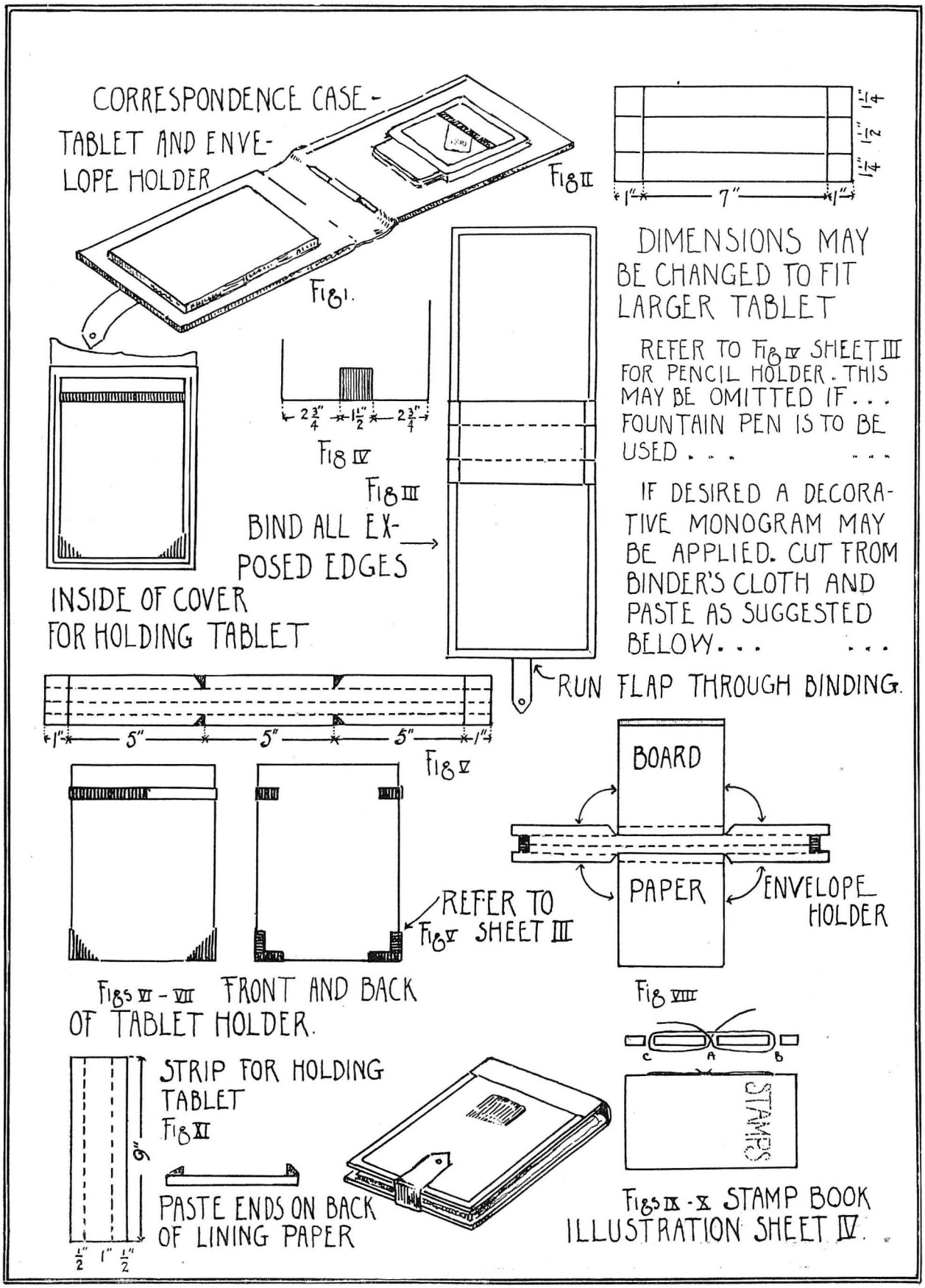
Cover for envelope holder and stamp holder combined. Paper 6½″ x 6½″. Bind one edge. Measure and cut as suggested in Fig. XII. Fold as indicated in Figs. XIII and XIV. Fold d against a. Fold c and b back of a and paste. Paste on face of envelope holder as indicated in Fig. I.

Stamp book may be made as suggested in Problem III.

Problem III. Tablet Holder—Envelope and Stamp Case.

Materials:

2 boards, 7″ x 9″.
1 board, 5″ x 5″.
4 pieces cover paper, 6″ x 7½″, facing and lining covers.
1 piece cover paper, 5″ x 5″, under part of envelope holder.
1 piece cover paper, 4½″ x 5″, lining for envelope holder.
1 piece cover paper, 6″ x 6½″, stamp book holder and facing for envelope holder.
1 piece cover paper, 5¼″ x 7½″, tablet holder.
1 piece cloth, 3½″ x 15″, cut 3½″ x 9″ and 3½″ x 6″, hinge.
1 piece cloth, 1½″ x 51″, cut as needed, binding.
1 piece cloth, 4″ x 4″, corners.
1 piece cloth, 3″x 16½″, fulness for envelope holder.
1 piece cloth, 2″ x 6¾″, strap for holding tablet.



1 piece cloth, 3″ x 5½″, flap.
1 piece cloth, 1″ x 6″, binding pocket for stamps.

Illustration Sheet IV indicates dimensions and processes. Fig. II hinge measurements—Fig. IV, location of flap. Figs. VI and VIII illustrate the making of the envelope holder. Fig. XI—Fold on dotted lines—sketch at side shows how to fold back ends and paste. Refer to Figs. II, III, VII and VIII for making corners.

Envelope holder is made in the way portfolio pockets were made in Problems I and II.

Construction of Stamp Book.

Fold several sheets of waxed paper 4″ x 5″ to make a book 2½″ x 4″. Over these fold a piece of cover paper of the same size. Perforate the folded edge as suggested in Fig. IX—Sheet IV and sew as follows: Beginning either on inside or outside, go thru A leaving about 2″ of thread extending out of hole and over to C and thru, over to B and thru and then to A and thru bringing the needle on the side of the long stitch opposite to the end which was left extending. Tie the part of the thread in the needle and the end of the thread over the long stitch.

FIRST AID TO THE INEXPERIENCED—IV

THE DEMONSTRATION

S J. Vaughn, DeKalb, Ill.

Reasons for the Demonstration.

THE necessity for the demonstration arises out of the inefficacy of words and of the disposition to avoid the wasteful trial, error, and discovery method of arriving at proper usage or procedure.

How difficult it is for immature pupils to "fit the action to the word," or to hear verbal directions given or to read them from a text and then to put them into operation in the use of a tool or the performance of a constructive process! What a vagueness of meaning and indefiniteness of impression words convey especially to the immature mind! For the purposes of this article, the reason is not far to seek. The limited fund of experiences possessed by immature pupils in this particular line makes it impossible for them to understand clearly from spoken or printed directions just how to perform the desired operation, or to proceed with a new line, process, or problem.

It is interesting to imagine what would happen if a teacher attempted to have a beginning class in woodworking square up a piece of stock from a simple verbal definition, description, and direction. But after a demonstration of this simple operation and after the pupil has gone thru the process himself, the direction to square up a piece of stock to certain dimensions calls up all those experiences of the former operation which interpret to the pupil the exact meaning of the direction and the proper method of procedure.

The trial and error method, which involves all manner of undirected experimentation, has but little place in the grammar grades as a means of determining tool usage and the processes of construction. Whatever values it may have in the primary grades, this method is not adapted to upper grade work by reason of its wastefulness of time and materials and of its encouragement of incorrect, haphazard, and slovenly habits of thought and action. In the beginning of any art, therefore, it is perhaps a wise policy always to put the beginner into possession of such established usages and mechanical devices as long experience and study have found to be valuable. Hence the demonstration undertakes to put into the hands of the pupil the means for accomplishment which would only be arrived at thru long, blundering, and discouraging experimentation.

The demonstration may be so timely and so properly conducted as to render it one of the most vital and effective instruments of instruction. It may, however, be so illy timed, so elaborate, and sometimes so needless as to miss the aim entirely and to defeat its own purpose.

The purpose of a demonstration, as indicated above, is to show the class by actual performance the proper use of a tool, the accepted method of procedure in some process of construction, the exact difference between two similar tools, or the dangers of misuse or wrong procedure. The demonstration, therefore, deals with large, general, fundamental facts, and must not be confused by a multiplicity of subordinate and inconsequential items.

There are certain principles by which the demonstration must be guided and certain requirements which it must satisfy, in order to fulfill the purposes and meet the needs for which it is given.

Guiding Principles.

1. *The demonstration must be so timed as to meet the immediate needs of the class with the work in hand.* Many a demonstration has been worse than a waste of time because it violated this principle. Scarcely any two boys work with the same skill and rapidity. Hence the matter of timing the demonstration to meet the immediate needs of a large class is a difficult and a very important question. To give a demonstration of end planing while half of the class are still occupied with their first exercise in surface planing, is to meet the needs of only half the class. The other half fail to grasp the idea of the demonstration because it is of no immediate use to them. When the time comes when they shall have reached the point where end planing is involved, they find themselves helpless and in need of another demonstration. To give a demonstration in the laying out of mortises while many of the class are still engaged in squaring up the stock into which the mortises are to be cut, would fail of satisfactory results.

To meet this difficulty, many successful teachers have resorted to two devices. One plan is to have the

rapid group proceed to other tasks in connection with their projects, or to provide some special work to fill in between the times at which the two groups reach the point for the demonstration. The other is to require the class, especially those members who are not quite ready to apply the demonstrated process to their projects, to perform the operation demonstrated on an abstract or practice piece. For example, many good teachers require classes to lay out a mortise, and even sometimes to cut it, in a practice piece, before attempting to make such a joint in the project requiring mortises. The immediateness of the need is so apparent that objection could scarcely be raised to such a proceeding.

2. *It must present a single fundamental use, procedure, or general fact.* This is another way of saying that the demonstration should leave a single strong, indelible impression in the minds of the pupils of the class. It should not leave a complicated mass of impressions. For the ordinary class, it might not be wise to attempt at the same time the demonstration of both the laying out and the cutting of a mortise. There are many excellent teachers who feel that it is seldomly safe to attempt to demonstrate the use of more than one important tool or process in one demonstration. These teachers are convinced that it is better to give several demonstrations in one lesson, with intervals of work and experimentation between, rather than risk the confusion of too many new ideas in one demonstration. Also, such teachers make a clear distinction between the demonstration of tool usage and the incidental use of certain tools in the demonstration of a constructive process.

In spite of the fact that the wisdom of this principle seems almost self-evident, it is not a rare occurrence to hear of a demonstration in which several different processes are gone thru or the uses of a number of different tools are shown.

The demonstration of end planing has simply *one thing* to impress upon the pupils and that is the exact method of manipulating a plane so that it will cut easily across the grain without splitting the stock. For the purposes of this demonstration, it must be *assumed* that the plane is properly sharpened and adjusted. These things are *incidental* to the main idea and must not intrude upon its time, except in an incidental way. The differences in planes are topics for other times and for other purposes than those concerned in this particular demonstration. Likewise, characteristics and kinds of woods employed in the demonstration are foreign to its purposes. So, also, would the boring and chiseling necessary to the cutting of a mortise be foreign to the demonstration of the laying out of the mortise. There are exceptional cases and exceptional classes, but this is a good general proposition.

3. *The demonstration must be brief.* This principle like all the others is much more important in connection with the work of younger pupils and students. However, it holds good in a comparative degree with all grades of workers. It is a difficult matter to hold the complete attention of a class of immature pupils upon a task of the teacher's performance for a considerable length of time. Hence, it is the part of wisdom to go rapidly to the point, to finish the demonstration quickly, and to set the pupils to the task while their impression is vivid and their enthusiasm high. Too lengthy a demonstration accompanied by too extended and complicated a discussion tires the class, destroys, rather than enhances, the interest, frequently confuses, always wastes valuable time, and, on the whole, defeats its own purpose.

4. *The work of the demonstration must be skillfully done.* There are few influences exerted on a class that quite equal that of a superbly skillful piece of work performed by the instructor in the presence of the class. There is scarcely anything that inspires confidence like the supreme and confident mastery of the tools involved in the demonstration. Such a mastery, however, need not, indeed in some lines it should not, attract attention away from the process involved and toward the skill of the instructor. It should make the task to be done appear easy, rather than difficult, of accomplishment. To pick up a saw or a plane and use it with the ease and comfort and absolute accuracy of the master, without false motions or ineffective strokes, is to command the respect and challenge the ingenuity of the class. The highest skill should be used with such care and discretion as to inspire rather than discourage the unskilled beginner.

A "slip-shod" demonstration is worse than no demonstration. False motions, ineffective strokes, careless accidents, and unsatisfactory execution that require apologetic explanations, render a demonstration not only ineffective but actually harmful. Many teachers would scarcely be willing to admit that the imperfectly executed parts of a demonstration are as injurious as a corresponding number of perfectly executed parts are helpful. But errors and faulty procedures on the part of the teacher in a demonstration license all manner of similar errors and excuses on the part of the pupils in their subsequent work.

The demonstration, therefore, from the standpoint of execution, must set a high mark of excellency from the standpoints of skill, method of procedure, time involved, and the clearness with which the end to be accomplished is set forth.

5. *The whole performance must be accompanied by concise and discriminating questioning and by a clear, accurate statement or discussion of the vital points involved in the demonstration.* The questioning is for the purpose of arousing thought, of bringing out the definite end which the operation or procedure to be demonstrated is supposed to accomplish, and of testing the judgment of the pupils as to the proper means and methods of accomplishing that end. It is a fact that has not been made sufficient use of, that much less difficulty would be encountered, if pupils were led to form more definite and clear-cut ideas of the exact ends to

be sought and the exact and proper means of reaching them. Much of the questioning may profitably precede rather than accompany the actual demonstration.

The statement or discussion accompanying the demonstration is for the purpose of giving expression in another form to the ideas expressed in action by the demonstration. The performance is simply reinforced by the oral recital of the facts, steps, and operations involved. In this manner, the proper terminology is used in its proper relations.

6. *The demonstration and accompanying discussion must not be confused by discussions of various related matters.* This principle is added as a reinforcement to principle number two and as a caution to principle number five. One of the greatest defects of the average demonstration and the one into which it is most easy to fall, is the tendency to include in the discussion a great mass of details, a great variety of related matter, and oftentimes a considerable amount of extraneous, or at least unnecessary matter, as well. In this way, the minds of the pupils are often distracted from the one fundamental aim and purpose of the demonstration. A case in point is where the teacher started in with a demonstration of the use of a chisel in mortising, and finished with an elaborate history of the chisel and a somewhat technical description of its manufacture. Such matters of information are admirable and should by all means be given, but they should be given at other times and not in connection with a specific demonstration.

Steps of the Demonstration.

There are three necessary steps in a complete demonstration, with usually a fourth step added in the assignment. These steps are as follows:

1. *The statement of the definite problem involved in the demonstration.* It greatly adds to the effectiveness of the statement, if the pupils have already encountered in their own work the need for the information which the demonstration is designed to give. Thus, if the class has reached a point where the need for a mortise arises, the statement of the problem of the laying out of mortises meets an active interest and a ready response. It is all the better if the teacher assigns the topic for investigation before the time for the demonstration. The clearer the actual problem is presented the surer the grasp of the pupil will be on all that is to follow. Hence, if the problem can be illustrated with drawings, photographs, and finished models of the exact steps to be demonstrated, all confusion will be removed as to just what the demonstration proposes to do.

2. *The actual execution of the work proposed in the statement.* This includes the correct and skillful use of the tools involved and the actual performance of the processes set forth in the statement. In this part of the demonstration, the instructor undertakes not only to visualize to the class the tool usage and constructive processes but also to set an example in the method of approaching and attacking a problem which he is willing for the pupils to emulate.

3. *The summary of the work done and the points to be emphasized, and the test of the pupils' understanding.* This part of the demonstration must be very brief and must consist only of such review and such questions as will more completely fix in the minds of all the pupils the exact facts brought out by the demonstration and the exact methods of procedure followed by the instructor.

4. *Assignment.* This consists of definite directions for the pupils' work.

Phases of a Recitation.

In case a demonstration is preceded by an assignment for investigation and report, the entire demonstration follows the same plan as a typical recitation in any other subject. A properly conducted recitation in any subject consists of four distinct phases, as follows:

1. *The test.* In this the teacher requires the pupils or students to report on the work previously assigned. This becomes the test of the pupils' understanding of the actual material assigned for the lesson. In the case of a demonstration, this part of the recitation serves as the statement of the problem.

2. *Instruction.* In this second step of the recitation, the teacher undertakes to lead the class out along the lines of certain implications and applications of the principles involved in the lesson. In this part, the instructor *contributes* to the fund of information and thought furnished by the text and by the class, and opens up broader fields of thought, discussion, and action. It is in this part of a recitation where the real *instruction* appears. Here also is where the inspiration and guidance are needed. The demonstration proper in a manual training class is comparable to this step in the ordinary recitation.

3. *Summary.* This appears in every good recitation, in order to leave the class with a clear, well organized conception of the problem involved in the recitation.

4. *Assignment.* Perhaps too little attention is given in all the school subjects to the matter of work and study assignments for the next lessons or tasks. No one need expect a clear, well organized recitation, if the assignment consists, as it often does, of "Take the next lesson," or "Prepare the next six pages." No rule can be formulated with reference to the proportion of time to be devoted to the assignment, but it is safe to say that in all the subjects of the curriculum, a sufficient time should be taken, at the close of each recitation preferably, to set definitely and clearly before the class the exact requirements and problems of the next recitation. After a demonstration, of course, the requirements are so specifically indicated by the performance of the teacher and by the summary that little additional time need be devoted to the matter of assignment.

The Process of Squaring Up Stock.

According to the principles previously laid down, the squaring up process requires three brief demonstrations, as follows:

1. The use of the smoothing plane in surface planing.

2. The method of reducing a given piece of stock to the proper width and thickness with adjacent faces perpendicular to each other.

3. The method of squaring the ends of the stock with a smoothing plane or block plane.

With a beginning class, it seems to be in the interest both of the economy of time and the clearness of presentation to precede the squaring up process proper with a short demonstration in the use of the plane and a brief interval of work on the part of the pupils with a smoothing plane. This first planing may profitably be done on the first face of the stock that is to be used in the other demonstrations. Likewise, it is also advisable to leave the squaring of the ends of the stock for a separate demonstration, after a second interval of work by the pupils in which they have attempted to carry out the instructions given in the second stage of the squaring up process. This is especially true if a block plane is to be used for the end planing. The wisdom of putting a block plane into the hands of a beginner is, at best, extremely doubtful. Also, it is very important that only perfectly straight pieces of stock be either used or discussed in this entire first problem.

A Typical Demonstration.

The actual steps in the second demonstration indicated above are as follows:

1. *Statement.*

a. Problem: To square up a piece of stock, or to reduce a piece of rough stock 1″x4″x12″ to a smooth piece 15/16″x3⅞″x12″ whose adjacent edges and sides are at right angles to each other.

b. Tools: Smoothing plane, trysquare, and marking gauge.

c. Procedure: Plane one side for the working face and test with trysquare with handle upright, as in the preliminary planing demonstration. Joint one edge for working edge and test with trysquare with handle against the working face. Gauge width, using the head of the marking gauge against the working edge. Plane to gauge line and test with trysquare with handle against the working face. Gauge thickness, using head of marking gauge against the working face. Plane to gauge line and test with trysquare with handle against the working edge.

2. *Execution of proposed work.* Having surfaced the first face in the preliminary planing demonstration, the instructor marks it as the working face and proceeds to the next step, the jointing of an edge. As the work progresses according to the plan of procedure indicated in the statement, emphasis is placed upon the specific points of importance in the method of work and the operation of the tools. For instance, attention is called to the order of the steps taken, the exact method of holding and operating a gauge, and the alternate application and release of pressure on the toe and the heel of the plane. The instructor, therefore, talks as he works, asking questions, answering questions asked by the pupils, making explanations wherever he thinks they will strengthen the presentation, and all the time attempting to keep the attention of the class riveted on the vital parts of the work in hand until the last stroke is made. He emphasizes the fact that every stroke is a conscious attempt to do a very definite thing and he strives to make his every stroke accomplish the desired end without error or loss of motion.

3. *Summary and test.* By means of questions, the teacher elicits from the pupils a restatement of the problem and a complete review of the steps he has just taken in the planing, gauging, and testing of the stock in the demonstration. A test is made of the knowledge of the pupils in regard to the uses of the tools employed, and the teacher emphasizes again the importance of the working faces, the proper holding of the marking gauge, the proper start and finish of a plane stroke, and the correct method of testing stock with a trysquare.

4. *Assignment.* This sets the problem for the pupils. The pieces of soft pine or basswood about 15/16″x3½″x10″ which were used by the pupils in the first planing exercise, are to be used again for a continuation of the work. The requirements are set forth to the effect that the stock is to be reduced to ⅞″x3¼″, and that the steps and methods of the demonstration are to be accurately followed.

In any demonstration, the emphasis is always on *performance.* The discussions are brief, exactly to the point, and very simple in statement. No one must expect an immature pupil to carry for any length of time a variety of steps or directions in his mind. Hence, this article has emphasized *simplicity, brevity, clearness of purpose and presentation, singleness of aim, organization of material and method, skill and ease in execution, and the timeliness and appropriateness of the entire performance.*

Frequent brief, simple, well organized demonstrations are infinitely better than the periodical giving of elaborate, complicated, and prolonged demonstrations that present so many operations and so much information as to leave the class bewildered and confused. The demonstration appeals to the imitative instinct; and while imitation may be, and frequently is, over-emphasized, it is a most valuable instrument in the hands of a skillful teacher. There are certain necessary and desirable ideas and methods in every art that can be most easily taught or acquired by imitation, and it is the business of the demonstration to present such ideas and methods.

THREE OPPORTUNITY PROBLEMS

M. J. Hughes, Seattle, Wash.

THE statement is often made that with proper organization "you can do anything with boys." Granting this there is always room for debate as to the net profits to the boys concerned in each undertaking.

A brief sketch of an attempt to handle three interesting problems, the construction, equipment, and operation of a shop, entirely with upper elementary grade boys may contain some suggestion or invite some criticism as to the net profit to the boys at this their most irresponsible period.

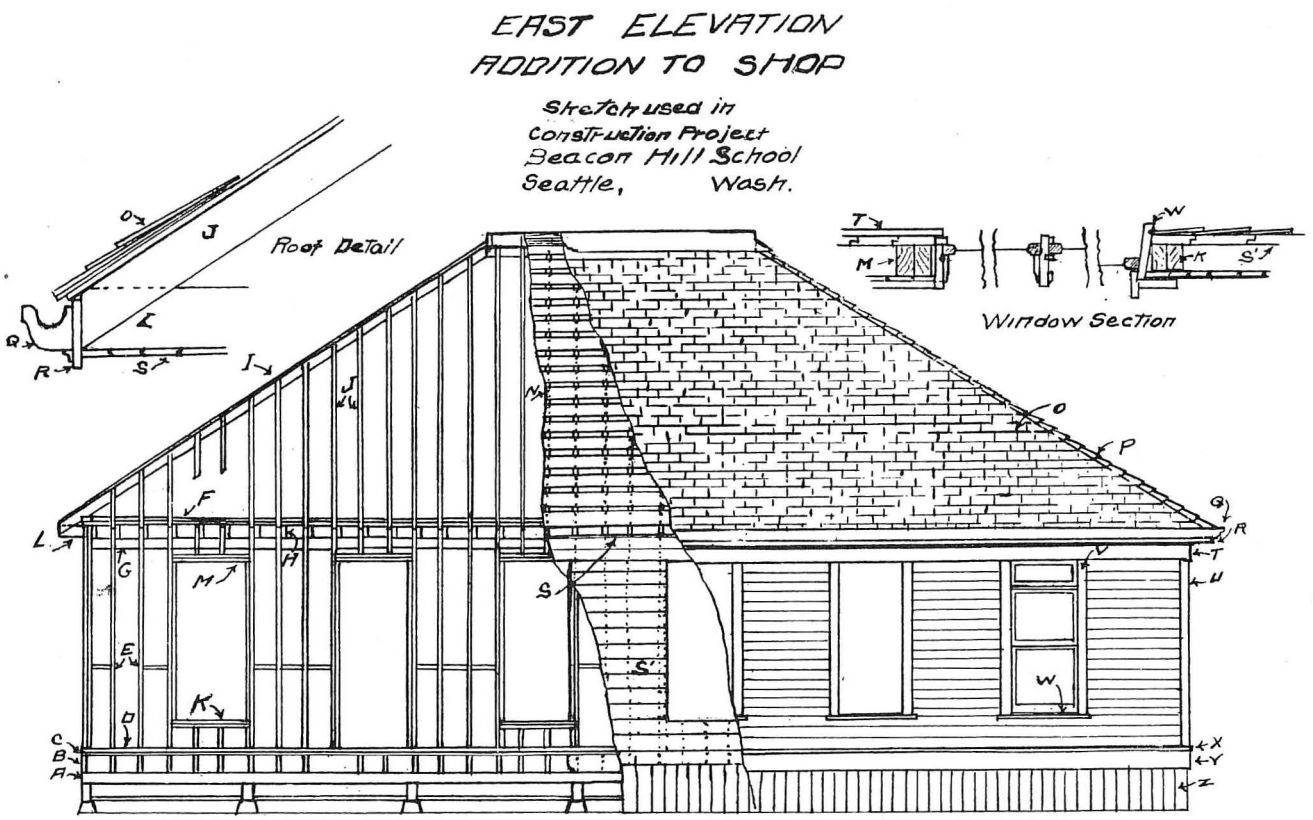
Construction of the Shop.

During the year 1917-18 when war pressure caused the suspension of practically all building in the school system, the erection of an addition to the original shop, with the consent of the maintenance department, was undertaken by the seventh and eighth grade boys of the Beacon Hill School.

The original building, half of which was used for a home-economics laboratory and half for a shop, was to be enlarged so as to double the floor space of the shop.

As a preliminary a large tack board was covered with paper and an elevation of the addition, drawn to a scale of two inches to the foot, was developed as the work progressed and reproduced by the boys to a one-quarter inch scale. Half of the drawing showed the framing and half the finished building. To make the detail clearer different colors were used in penciling in the separate parts. By introducing only one term at a time and that just before it was to be used on the building, the boys learned to call the various parts by their proper names. By applying the framing square directly to the drawing, rafter cuts were easily illustrated and rafter and look out lengths read directly from the square.

Assignment of work and responsibility was made simpler by marking off sections on the drawing and assigning by sections. This assignment of work eventually became arbitrary as pupils were found to work better on certain work or with certain individuals. Where possible two boys who made good partners were assigned to, and held responsible, for a certain task.



A Sill
B Joist (Floor)
C Rough Floor
D Lower Plate
E Studs
F Upper Plates
G Ledger Board
H Joists (Ceiling)
I Hip Rafter.
K Sub Sills

J Jack Rafters
L Lookout
M Header
N Roof Boards
O Shingles
P Hip Shingles
Q Gutter
R Fascia
S Plancher
S' Sheathing

T Frieze
U Cornice
V Casing
W Window Sill
X Drip Cap
Y Water Table
Z Skirting

This was found to be a better plan than that of placing a foreman over a larger group.

The concrete piers were made a few at a time so that practically all the boys had their turn at measuring and mixing and filling the forms.

It was of course impracticable to attempt to shingle in the ordinary way i. e., by using a chalkline every three feet and spacing with a hatchet gage. Each tier was laid to a straight edge set to a chalk line, and extra safety strips were used on the roof to the detriment of the roof but to the safety of the boys.

Much building time was no doubt wasted in demonstration and in replacing faulty work; much material was no doubt wasted by carelessness and inaccurate cutting; but the responsibility experienced, the variety of problems in elementary carpentry met, and the experience gained in a number of essentials, such as proper nail spacing, holding the hammer and using the chalk plumb and level, that the "bench work" boy does not have, should put the undertaking on the profit side of the balance.

The accompanying cut taken after the building had been enclosed, floored and ceiled, shows part of the boys ready for the "next."

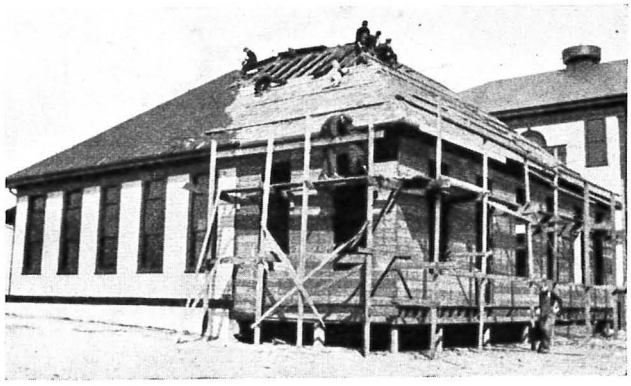
Installing the Equipment.

The new addition now being made a part of the shop, the work of partitioning, building the lockers and benches, and installing the power machinery was handled as regular shopwork.

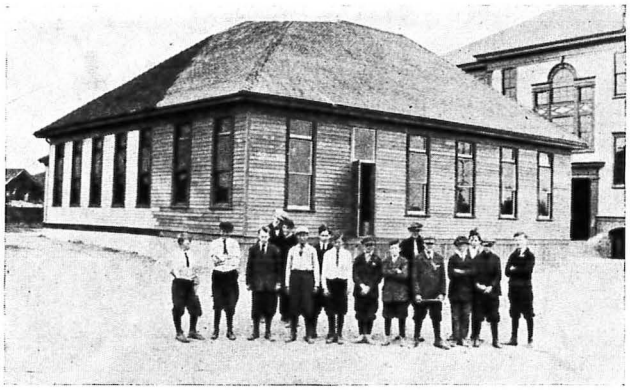
Blue prints of the floor plan and partition details had been prepared and these were made the basis of the boys' instructions. The boys were allowed to choose partners and each pair of workmen was held responsible for the completion of its unit.

The assignment for each boy was kept posted after his name on the class roll which he could see from his desk when the class assembled. Thus confusion was avoided when any change in the assignment was made. If after John Smith's name appeared C-2, John by referring to the shop index knew that he was a carpenter working on the finishing room; if his assignment was M-5 he was a machinist working on the drive shaft.

In this work more initiative was required of the boys than in the framing, inasmuch as many of the sections were similiar and the pair of workmen who were



THE SHOP UNDER CONSTRUCTION.



READY FOR THE NEXT PROBLEM.

slow to follow instructions were able to follow their neighbors' lead. Those with the least aptness for individual work were given bench work constructing kits, drawers and the like for the tools.

The old tool and lumber room was made over into a locker room and a new tool room, accessible from both sides of the shop, was built in. Windows were framed into the partition between the old and new shops which greatly improve the lighting and serve as receivers for work passing between the benches and the machines.

The floor plan shown admits of the criticism that the stock room is too far from the wood working benches. This is because every effort was made to admit as much light as possible from the south and east. The partitions of the stock room and finishing room are of V ceiling, those of the tool room and tracing room are wire netting above the 52″ cabinets, and those of shops, rail and baluster partitions framed to a height of seven feet.

In the installation of the machinery the motors and shafting were placed beneath the floor so that no space is used in housing belts. In the arrangement of the wood working machines a saving of floor space was the governing idea. It has been found that the operators do not interfere with each other and that there is plenty of room for ordinary work.

To provide for a storeroom a section of the ceiling was ceiled separately so that when hinged at one end and lowered, it could be converted into stairs, thus providing the use of a spacious attic without taking up floor space with a stairway.

The arrangement of the benches in the original shop does not save floor space but offers the best lighting when the room is used for drawing. By placing the instructor's desk in the tracing room he may while at his desk have every part of the shop even to the lobby and finishing room under his eye.

In the work of equipping the shop probably less new problems were met than in the framing but as each part of the equipment represents the individual effort of some boy the sense of accomplishment was no doubt paramount to the manipulative experience gained.

The Shop in Operation.

In the operation of the shop efforts have been made to make the shop automatic. This does not mean

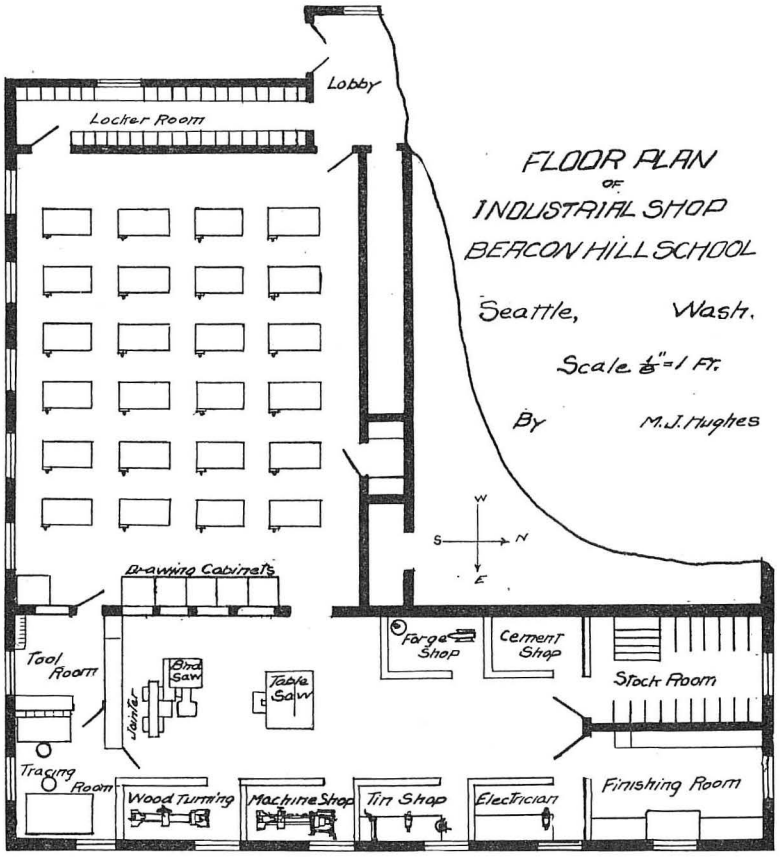
mechanically automatic but that the responsibility is placed on the different individuals automatically.

In front of the benchwork room where the classes assemble are placed the class rolls high enough to prevent congregating and to be seen from all parts of the room. Preceding each boy's name is a number of three figures. This is the boy's individual number which he uses to mark work, draw tools, etc., and which designates his locker and drawing cabinet. Thus, if a piece of material marked 214 is found in the shop it is identified as belonging in locker No. 214 and to a boy who occupies bench No. 14 during the second period. After

ard widths and 6, 12, 18, 24, 30 and 36 inches as standard lengths the cost is most easily computed.

The bookkeeper is appointed for the semester by the instructor. He corrects any errors in the sales slips that have been made, files them in their proper place, and receives and receipts for money paid in. The original receipt slips are returned to the pupils when paid and the duplicate slip is marked with the amount paid. This constitutes all the record necessary.

By having a "painter" in charge of the finishing room much of the usual nuisance of uncleaned brushes, oily waste, etc., is eliminated.



SKETCH FLOOR PLAN OF THE SHOP.

each name on the roll is a card stamped with a letter to denote the boy's occupation and a number to denote his job. These are found on the shop index in another part of the room. This method of assignment does away with the "What'll I do today" boy who usually has unfinished work in his locker.

All tools are kept in the tool room, individual bench tools being kept in kits correspondingly numbered. The beginning, "clean up," and dismissal bells are rung by the tool man who holds the beginning bell until the demonstration at the beginning of the class is finished.

The stockkeeper sells at his window all material and supplies, makes a record of the sale in duplicate, and hands the sales slips to the class bookkeeper at the end of the period who files them after the pupils' individual record cards on the instructor's desk. All short material is cut into standard widths and lengths and sold as a piece. By using 3, 4, 6 and 9 inches as stand-

A foreman, elected for the semester by the class, has nominal charge of the shop. His duty is to see that the shop runs as per schedule. This need not interfere with his getting all the essential manipulative experience himself. Each boy is, of course, responsible for cleaning of his own shop and bench, and the foreman acts as inspector for the cleanup.

The power machines are used only by permission or assignment. On a factory project where a number of pieces are to be constructed, the parts are laid out and marked on the benches and placed in the "unfinished"' side of the window corresponding to the machine that is to do the work. The operator on the machine does the work and places the parts in the "finished" side of his window. In this way a project can be carried on by two or more classes without waste of time. It is found advantageous to use the same method to a certain extent on individual work. The owner marks his piece

and files it in the proper window where it is worked in its turn by the operator on the machine. Much loss of time and danger is thereby eliminated.

As to the allotment of time for the different assignments, this varies with the class. In the seventh and eighth grade industrial classes having five ninety-minute periods per week, the tool keeper, stock keeper, and painter serve for one week. In shops that admit of two boys working to advantage, two weeks may be allowed without disturbing the order of assignment. However if some project is put into each shop upon which each boy does some work during his allotted time he will have an interest in the shop which will hold his attention to the work done there during the entire year. An example of this is a telegraph line, the instruments of which were made and installed by the "electricians." This was the product of the entire class one working at a time.

The segregation of the boys by means of the so-called shops eliminates moving about on pretext, that is, it eliminates all pretexts. It is also intended to impart a sense of possession and responsibility and to give a trade asmosphere.

It is not intended in this article to discuss courses but simply to set down some of the methods applied in the mechanical operation of one elementary shop in which some effort is made to give prevocational work.

It will be noted that much student time is used in the mechanical operation of the shop and this question is in order: What are the objects?

1. Citizenship, by individual responsibility assumed in turn.

2. Individual efficiency eventually derived from plant efficiency.

3. Vocational guidance, by making the work real.

THE APPRENTICE NOTE BOOK

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FROM time immemorial man has noted his progress by characters and symbols. As a new item arose in his scheme of knowledge, he made record of it, from the age of hieroglyphics down to the twentieth century method of bound volumes, editions *de luxe* and printed matter of all kinds.

Every profession recognizes today that important facts must be recorded for future use. The mechanic knows the value of classified knowledge, and sooner or later sees the need of a note book in his work, but does not always understand how to prepare one. He is not sure of his facts as they come to him, does not know how to analyze or classify the material, and often has little conception of the comparative value of various ideas in his possession. It is a difficult matter for him to jot down, in a comprehensive form, the different trade facts which are of special value in his work. The mechanic is only on older apprentice, still learning new things. The experiences of the older man are continually being reproduced in the lives of the boys learning the trade. The apprentice is going over the same ground as the journeyman, makes the same mistakes and will arrive at years of maturity with as little initiative, if he is not taught otherwise.

The average apprentice boy, today, has his mind crammed full of a variety of ideas. He has undertaken to become a skilled mechanic and has bound himself for a period of four years at a low wage. He could usually earn more at some other work, for the time being, and the fact that an honorable and lucrative profession is open to him later, does not always appeal to him during his apprenticeship. He often lends an attentive ear to the prejudices and advice of his associates. He may get the temporary notion that his trade is not worthwhile, and that keeping a note book is a waste of time. The number of boys, who will do this work voluntarily, is limited. It is necessary to assist them in deciding what notes to take and to encourage a proper use of them.

It has been demonstrated many times that youth is the period for an education, and this is true with the apprentice. His note book serves several purposes. It is primarily a collection of useful facts, as will be explained later. It is a means of developing habits of care in selecting essentials, as well as accuracy in keeping records. It will also encourage a feeling of pride in one's work, and make for the growth of that valuable aid to success and happiness, the mechanic's *esprit de corps*.

Since this article will be quite largely read by teachers, who are interested in industrial school work, we shall attempt to show what we have accomplished, by the note book, among our Milwaukee apprentices. The ideas explained will be suggestive for work in other lines and among other classes.

Due to the short time at the disposal of the apprentice for school training, the note book can receive only a few minutes a day. The technical, or trade, information should be confined to the particular needs of the pupil in question. That is, we do not expect machinists to fill their note books with material for moulders or patternmakers, unless such information is of value in these other trades.

The following samples of work will show what can be used. Much of this material can be obtained from standard texts, as will be readily noticed. This does not discount its value, for we do not claim to be giving original matter. It does serve to emphasize essentials, however, and puts it in a convenient form.

Arithmetic.

Rules for the circle:

Circumference of circle equals diameter x3.1416, or, IID.

Diameter of circle equals circumference divided by II.

Area of circle equals .7854 D^2.

Another rule pertains to the method of changing a common fraction to a decimal, or a decimal to a common fraction. Examples, completely solved, showing how to find the roots of numbers, may be given, altho such information is commonly furnished in tables. Short cut methods are given for handling various forms of fractions in the four fundamentals. All the rules are put in shape for immediate use, so that the apprentice has a ready reference.

Drawing.

While most of the drawing work is taught at the drafting board, still there are notes and rules worth jotting down, which would otherwise be forgotten. For instance, if a mechanic should want to know the various dimensions of a bolt, he could calculate the thickness and width of both head and nut from a table of standard sizes. He would know the radius for the round end of bolt, as well as chamfered curves on hexagon or square heads and nuts. Thus, the short width of either hexagon or square nut or head equals 1½D plus ⅛″, where D equals diameter of bolt. The thickness of the head equals ½ of the short width, or distance across flats. The thickness of the nut equals the diameter of the bolt. This information, as well as other rules for bolts and nuts, is also obtainable from standard tables, but such tables are not always at hand. The note book is a convenient place to keep them.

Another set of rules relates to the designing of gears. We will not go entirely thru the explanation, but will give as much as should be taken up in one lesson.

Gears.

Definition of diametral pitch.

Diametral pitch is the number of teeth to one inch of the pitch diameter.

Problem: Find the number of teeth in an 8 pitch gear having a 13¼″ pitch diameter.

A number of rules are given for gear calculations and the apprentices make sketches of the different parts of a gear, name the parts and indicate the application of the rules. The gear rules are of special value to the pattern maker and machinist.

Elementary Mechanics.

Under this heading may be given simple rules for the application of mechanical principles in every day shop use. The lever laws are given and explained. Formulae for the work of a jackscrew, for horsepower and other items of this nature are entered and used. When a pupil is in difficulty as to the solution of a problem, the instructor will refer him to the note book for assistance. This brings very forcibly to the boy's mind how valuable a set of notes may be, and shows the necessity of keeping them accurately.

Along with the study of Mechanics may be included some elementary work in materials of construction, a study of the strains and stresses put upon them, and some tables showing the capacities of different materials under different stresses.

Machinists.

In giving notes to a tradesman, in his special line, it is well to consider, first, what are the peculiar needs of his work. The instructor should find out the bits of information, which are going to be most useful in the trade, and confine his note accordingly. One of the puzzling things for a machinist is to make calculations for gear combinations, on a lathe, for screw cutting. Altho it is not necessary to know this on the new type of lathe, there are many of the old kind still in use. Other rules may refer to setting the index head on a milling machine, to the proper cutting speeds and feeds for different materials, or to calculating pulley sizes, belt speeds, etc.

Patternmakers.

The patternmaker is interested in the woods he uses and the methods of making a pattern. A very useful table for him is a list of the different woods used in patternmaking, followed by numbers to show how much a casting, made from this pattern, would weigh, for different metals. This table is useful for the foundryman as well. It is not to be supposed that the apprentice pattern maker can learn all the different methods of constructing patterns, while at work in the shop. If he can be taught a new "kink" by the note book method, he can put it into use immediately.

Other Trades.

By this time the reader will see the general scheme of procedure and it will hardly be necessary to detail more items. The notes for the foundryman will include special things of value in that trade. Other crafts, such as forge work, carpentry, etc., can be treated in the same manner. The instructor must first decide on the material demanded by the trade, and then fashion his notes to meet these conditions.

The note book should not be confined to trade facts alone. The apprentice is a young man, still moulding his habits of life, and his instructor has a fine opportunity to make lasting impressions upon him. A few notes on matters of hygiene will serve a good purpose and are easily given. Certain facts, or even mottoes concerning civics and civic life, are very acceptable. English may be taught in this way, also. We find that many apprentices do not know how to write a letter correctly. If the form of a letter is illustrated in the note book, it can always be used as a reference. Short rules for capitals and punctuation are also valuable for this pocket library of the young journeyman.

In passing, we wish to repeat that the illustrations we have used are only suggestive and not in any way complete. We have taken a bit here and there and of course could not touch on all the contents of a hundred or more pages.

Taking Notes in Class.

Now that we have indicated in a general way what may be done in this direction, let us say a few words more about the actual work of doing it, or managing the job. General notes, for all members of the class, may of course be taken up as classwork. The notes may be dictated for the pupils to copy, or they may be written on the board. If the class is composed of boys from different trades, one set of notes can be prepared for each group. Quite often an individual pupil mentions some fact to his instructor, of peculiar interest to that particular boy. The instructor will tell him to enter it in his book, altho the mere fact itself may be of doubtful value and only of passing interest. It is the habit forming feature behind it which is of real value.

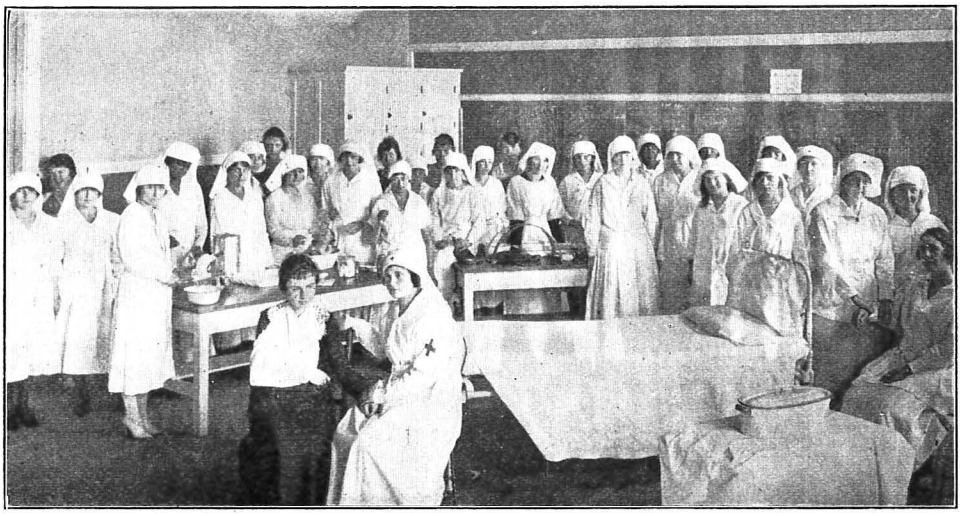
If we may presume to give advice to other teachers on this matter, let us say that the way is not all rosy. In the first place the teacher must exercise a great deal of care in gathering his material. These notes are in no case to be thrown out as a sop. If any lesson is to be filled in, or something is to be done to mark time, surely the note book should not be made the "goat". The notes should be of real value and able to stand inspection by an outsider. The boys will be showing these books to journeymen and foremen in the shops, and the pages will be criticized from all angles.

Another matter to be studied with care, is how to make each boy keep his notes up to date. Some will do this eagerly, while others will slide along carelessly and soon be in arrears with their entries. Some will expect to copy the notes later from a neighbor. This is human nature and accords well with the actions of college boys, as teachers can well testify. Some will forget to bring their books or will lose them. The books cannot be kept at school, for the primary idea is to furnish a reference for shop use. To overcome all these difficulties the instructor should devise a rigid system of follow up and aim to keep a check on each book. He may require them to be handed in periodically for inspection and grading.

One of the great joys coming to the teacher is in the nature of appreciation on the part of pupils, or commendation from the outside. When apprentices thank us for the efforts put forth we feel quite gratified. When men in the shops tell us we are dealing correctly with the boys, by giving them this or that particular kind of instruction, we feel reassured in our work. And when journeymen send to us continually for extra copies of notes and instruction sheets which we have given the classes, then we are certain we are "delivering the goods."

Just a word now as to the comparative value of the note book in school work. It is not a major proposition as far as the curriculum is concerned. However important it may be, only a few minutes per day should be devoted to it. Its worth is apparent in the use which can be made of it. The instructor can be very effectively show the value of such a book and silently suggest its use, by having one of his own and making good use of it before his class.

In conclusion let us say that very little instruction can be given without printed matter of some kind. Books serve as guide posts to set us aright. Our textbooks are charts upon the intellectual sea. The boy, who builds his note book during apprenticeship, has begun to chart his sea and will look back in manhood with pride upon his work. It may be the nucleus of a library, growing in usefulness as the years go by.



HOME NURSING.

Home nursing is an established course in one of the high schools in Los Angeles, Calif., and is very popular with the girls. The classroom is most interesting with its manikin, bed and dummey and its complete medicine cabinet. The teacher in charge lectures on physiology, hygiene, sanitation and food for the sick, and by practical demonstration teaches the care of the sick, and the sick room, and first aid. Then the girls wear their uniforms that look very professional. With the very excellent equipment most modern methods are taught and the work can by no means be considered play. This is a Home Economics course and one which every girl in the high schools should take. There are fifty-one enrolled in the class.—C. A. K.

ART METAL WORK

Emil F. Kronquist, Washington High School, Milwaukee, Wisconsin,
Special Instructor Stout Institute, Summer School

A SHORT course in art metal work was given by the writer to a summer-school class of teachers where 42½ hours were available. What could be done in this period of time to gain a general knowledge of how to handle the baser metals?

A complete desk set was made, consisting of:

Four corners to hold blotter pad.

One ink well.

One rocking blotter.

One pen tray.

One letter opener.

One calendar and stationery holder.

One stamp box.

This set can be made in copper or brass. Either material can be purchased in any hardware supply store. Soft sheet copper or brass to be used. The necessary tools will be mentioned as we go along.

The Corners.

Make an exact development on drawing paper as shown in Fig. 1. Cut folding lines a-b half thru and

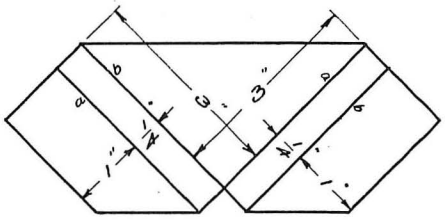


Fig. 1.

then cut pattern out and fold together to be sure it is all right. Cut from soft sheet copper gauge 24 Browne & Sharpe, four pieces to the approximate size. Clean metal in a "pickle" solution (sulphuric acid and water about 1 part to 50 parts of water; add the acid to the water) use powdered pumice or Dutch Cleanser to scour it with after removing it from this solution. Select the best side of the metal for top side of work. Now planish the entire top of surface of the metal with a steel hammer having a slightly curved surface. Figure 2.

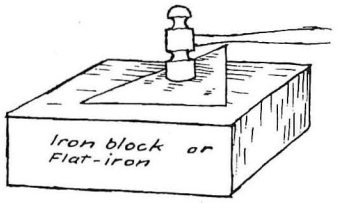


Fig. 2.

The application will result in a delightful hammered texture. This will harden the metal considerably; it will be necessary now to anneal the metal, the process employed to restore ductility by the application of heat until a cherry red hue is attained. The gas blow pipe with foot bellow is best adapted to this process of annealing, but an ordinary house gas plate can be used. After annealing an oxide is formed on the metallic surface. This objectionable film is removed by throwing the metal into the pickle solution, leaving it there a few minutes. Now rinse in water and dry. Straighten the metal which is now soft, with a mallet on a flat iron. Lay out the paper pattern on each piece of metal and scribe carefully around it. With a pair of

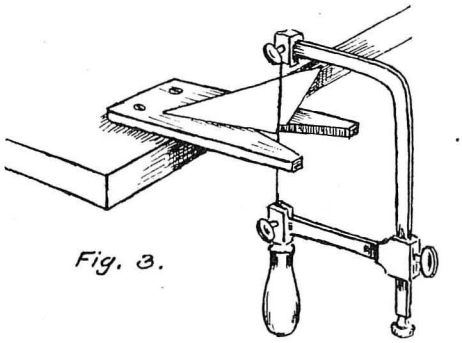


Fig. 3.

snips cut out each piece. If any curves or fine details are to be cut it will be necessary to use a jeweler's saw. A six-inch deep frame with a No. 1 blade is an all around good tool, which, by the way, can be used for fine woodwork also. Figure 3.

To bend the corner to proper shape cut a piece of hardwood ¼" thick and one corner "square." Place the metal accurately on the line. Now with a piece of scrap

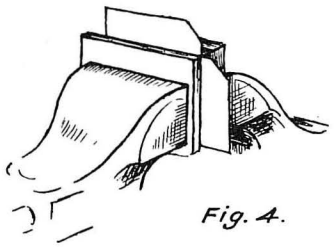


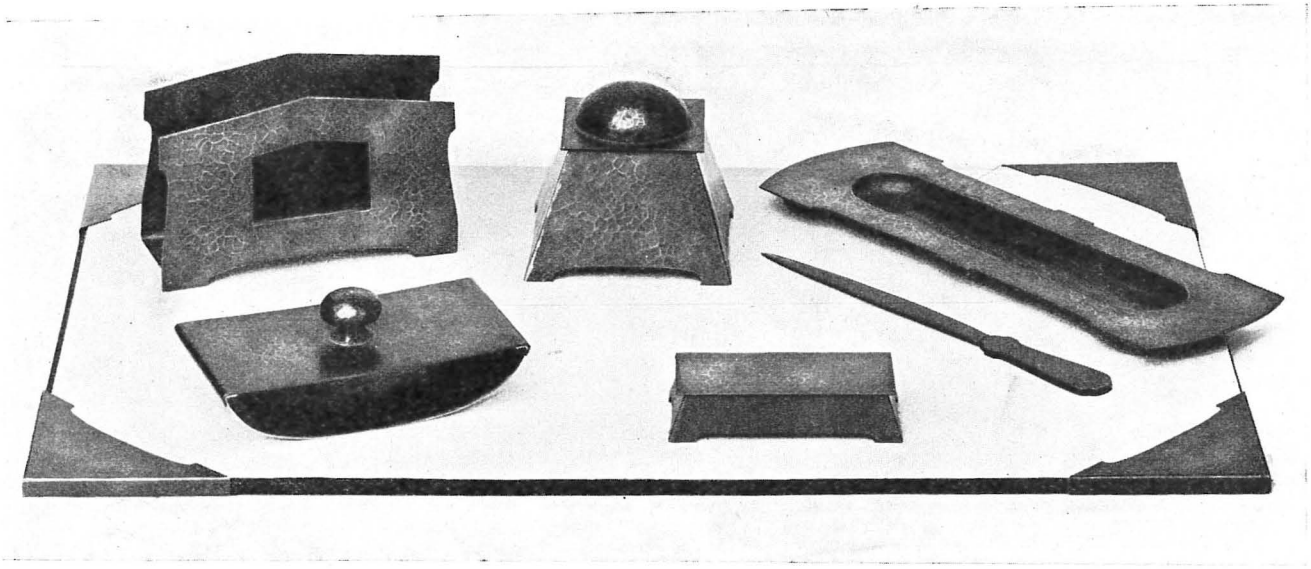
Fig. 4.

wood as backing, squeeze in the vise while the metal is bent over the ¼" wood. Figure 4.

Soft Soldering.

The process of soldering may be divided into two classes, hard and soft soldering. Soft soldering is the simpler, it requires less heat than hard soldering. It is always necessary to use a flux when soldering to prevent the oxide from forming on the metallic surface during the process of heating, or in other words, to keep the spot clean where you want the solder to run. Use a zinc chloride, prepared by adding zinc cuttings to muriatic or hydrochloric acid. Let stand until it has finished boiling, then add a small quantity of sal-ammoniac which will greatly improve this soldering fluid or flux. For solder use what is commercially known as half-and-half. (Half tin and half lead.)

Place a small piece of solder inside of corner and add flux with a small brush. Now hold the corner over



THE COMPLETE DESK SET.
Made by Mr. Paul Nelson, Racine, in the Author's Class.

a Bunsen burner or alcohol lamp until the solder has "run" or melted. If any trouble is encountered it is generally due to a poor joint or not enough flux, or the metal is not clean. Remember you can not fill a poor joint with solder any more than you can fill a poor joint of wood with glue.

The finishing or oxidizing will be explained later when the set is completed.

Ink Well.

Make on drawing paper an exact development of the main part (a) of ink well; cut bending lines 1-2-3 half way thru and fold together. Figure 8. Cut from sheet copper or brass gauge 22 B. & S. a piece to approximate size, then clean and planish in same manner as was done in the case of the corners. Anneal, pickle and straighten the metal. Lay out the pattern accurately on metal and scribe around, also marking bending

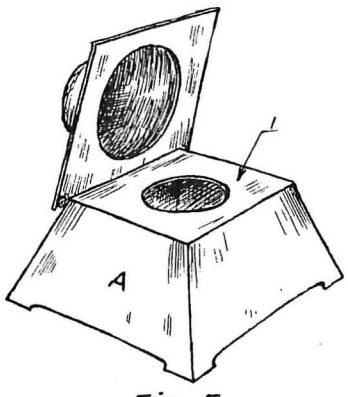


Fig. 5.

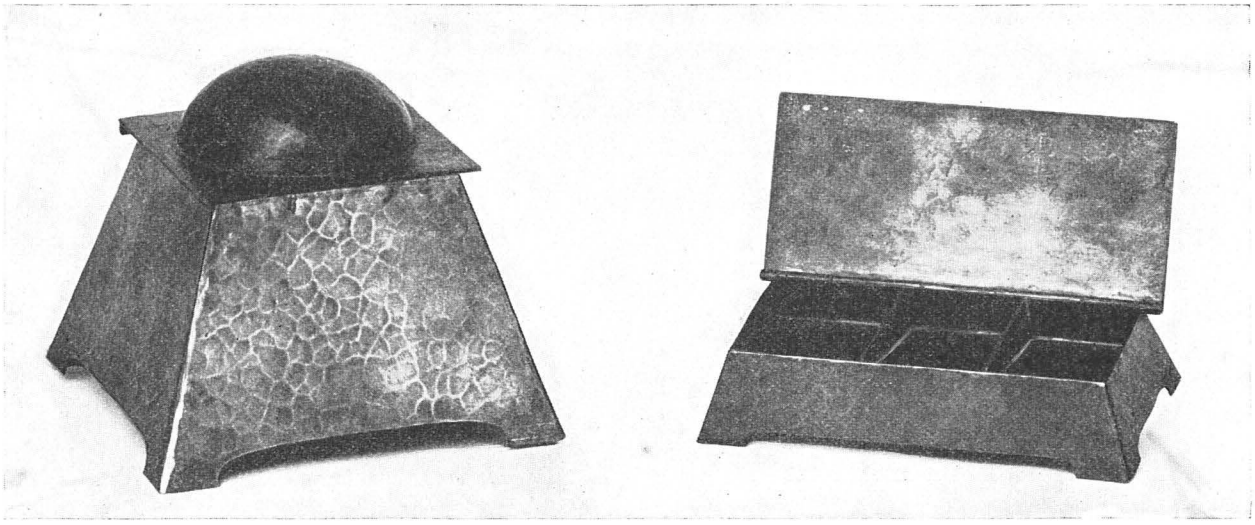
lines 1-2-3. Cut with the shears as much as possible, the rest to be pierced and sawed. Now with a file bevel the edges x-y, figure 6, to an angle of about 45°, then straighten the metal with a mallet if it is not perfectly flat. It is now ready to be bent. Squeeze the metal between two hardwood blocks as was done with the corners, and bend on lines 1-2-3, figure 8, bringing together edges x and y. The point thus formed is to be hard soldered. For that reason it must be well prepared, accurately fitted and clean. It will be necessary to tie the joint with a piece of annealed iron wire as shown in figure 7 (that which is sold in hardware stores as stove pipe wire is right).

Hard Soldering.

Hard soldering always requires a red heat of the metal to make the solder run. Silver solder is used for most work. It is prepared in different grades—easy and hard flowing—to suit the different types of work. One melts or runs at a lower temperature than the other. It is made of an alloy of silver, copper and zinc, but it is not advisable to make your own solder as it can be purchased from any jeweler or, still better, from a refiner and assayer such as Thomas Dee & Co., 6 So. Wabash Ave., Chicago. The price now is $1.40 per ounce. One-fourth of an ounce goes a long way. The flux in use for hard soldering is borax. Borax is the most perfect flux in the protection from oxidation of a metal surface.

Rub a piece of lump borax on a slate or piece of slate, which has been slightly moistened with a few drops of water, until a thin, milky substance is produced. Cover the joint to be soldered with the flux and place a few tiny pieces of solder on the same. Apply the heat very gradually at first so that the solder does not boil away. Now get the whole surface or object heated up red hot as quickly as possible and then apply or concentrate the heat where the joint is to be made. Solder will always run to the hottest place. It is very important to get a quick heat as an oxide will otherwise form on the metallic surface in spite of the borax.

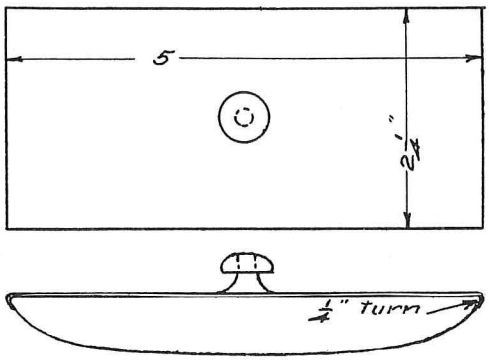
After having soldered the corner, leave it in pickle until clean, then straighten and square up with hammer and file. Cut the piece marked 1 (figure 5) from gauge 22 metal. Planish and remove a one-inch round piece



THE INKWELL.

THE STAMP BOX.

tempted it is absolutely essential that the article be made perfectly clean by washing it with soda water and brushing with fine sand, pumice or whiting.



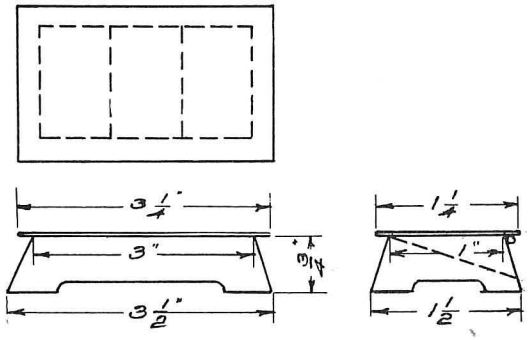
DETAILS OF ROCKING BLOTTER

A very beautiful brown color is produced by allowing the work to remain in a solution made up of:

Platinum chloride, 1 grain.

Water, 500 grains.

When the work has become tarnished all over transfer it to a stronger bath:



DETAILS OF STAMP BOX.

Platinum chloride, 2½ grains,

Water, 500 grains,

until the right depth of color has been attained.

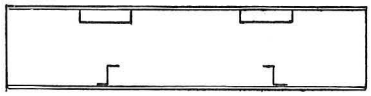
A color on copper from a light brown to a deep blue-black can be produced by this simple and widely used recipe:

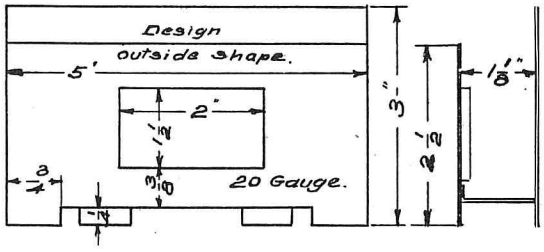
"Dissolve in boiling hot water a small piece of potassium sulphide (liver of sulphur), dip and rinse in water, using a whiting to rub off the high lights.

A green patina on brass and copper:

Ammonia chloride, 125 grains.

Common salt, 125 grains.





DETAILS OF CALENDAR.

Ammonia, 5 drachms.

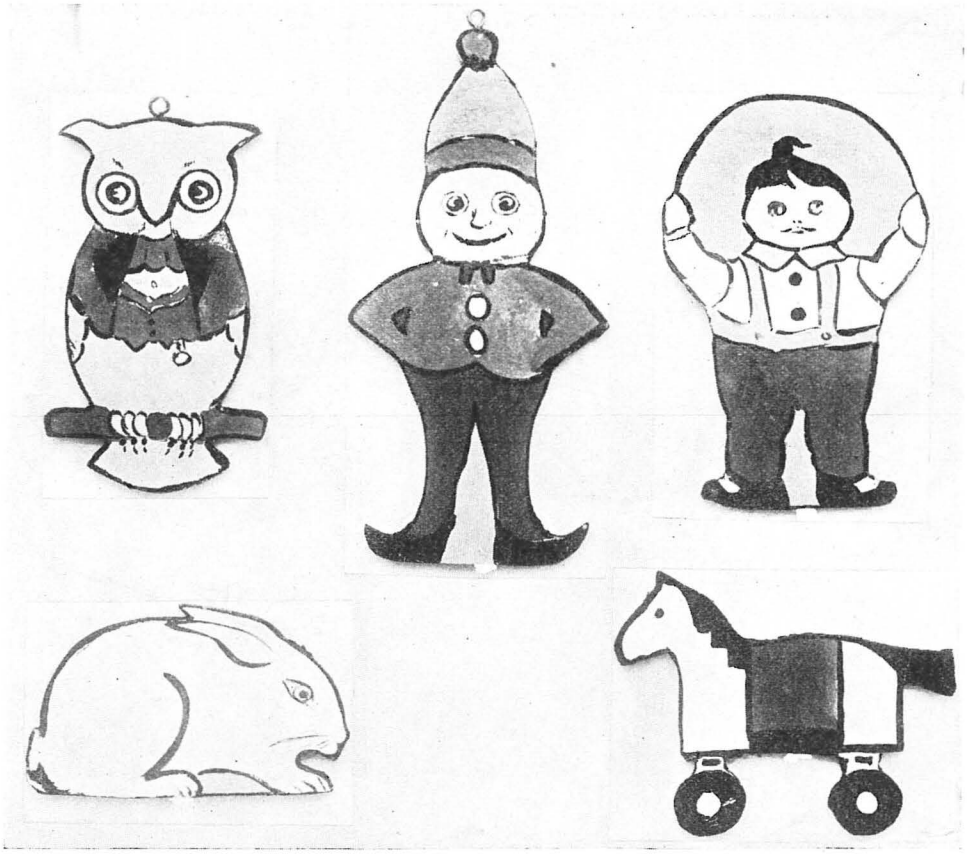
Water, 16 oz.

Apply solution and let stand from day to day. Repeat if a deeper color is desired.

A black color on brass can be produced by dipping in a solution made up of 1 part of copper nitrate to six parts of water. Place in a hot oven until the green salts turn black.

ANNUAL TITLE PAGE AND INDEX

A title page and complete index to Volume VIII, 1919, of the INDUSTRIAL-ARTS MAGAZINE has been prepared. Copies will be sent gratis, upon request. Address post cards to Subscription Department, Industrial-Arts Magazine, Milwaukee, Wis.



A FEW OF THE CHRISTMAS TREE ORNAMENTS. THE BLACK-AND-WHITE REPRODUCTION GIVES NO HINT OF THE RICH COLOR EFFECTS OF THESE ORNAMENTS.

THE CHRISTMAS PROJECT

Flora B. Potter, Whitewater, Wis.

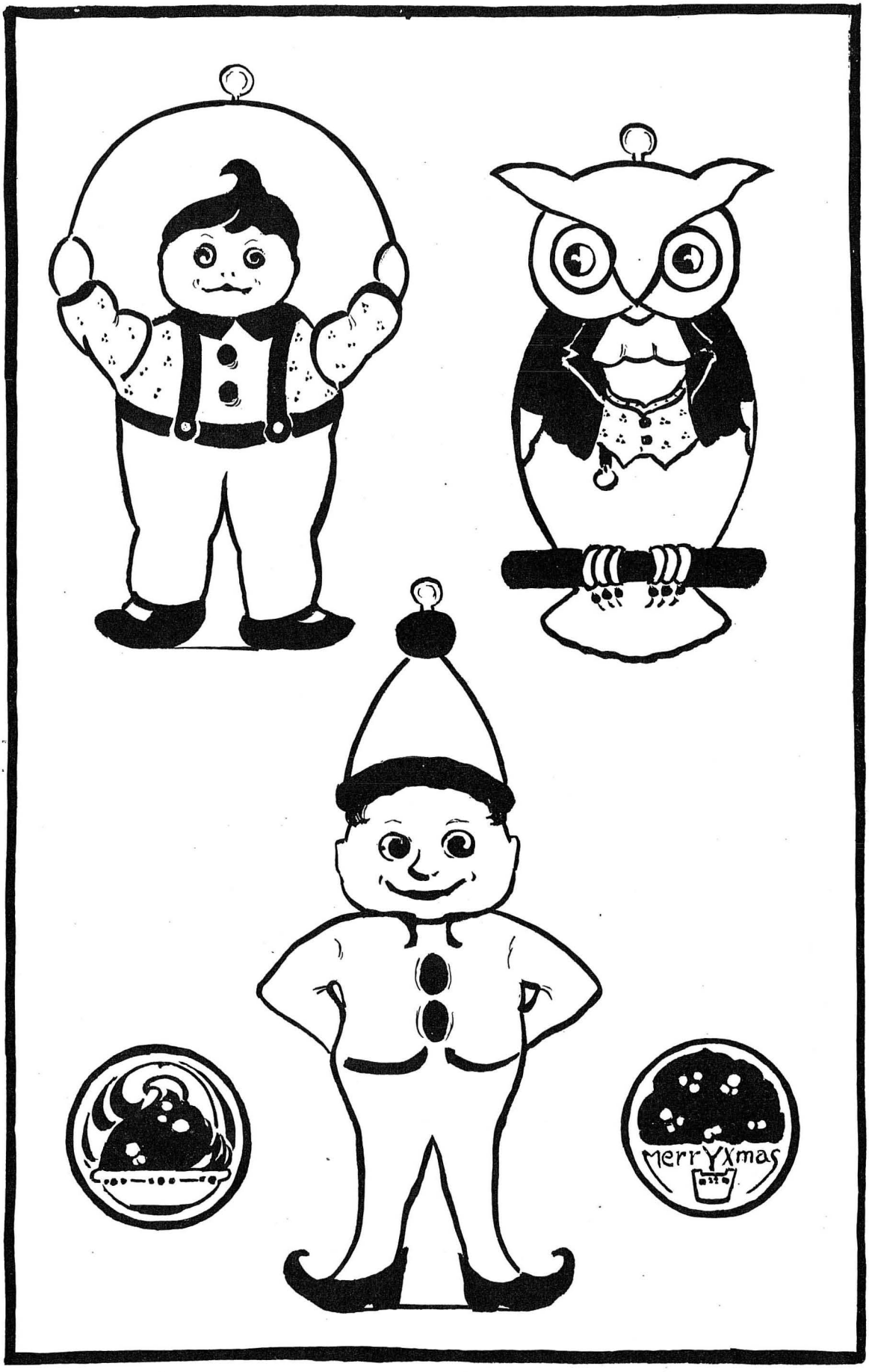
CHRISTMAS is the time when all the world shares in each other's happiness. Perhaps nowhere is the spirit of preparation so great as in the schoolroom where teachers are surrounded by veritable armies of little workers. Children love color; they love to be generous and with their own hands fashion a gift for parent or friend; they like to feel that by doing, they become a part of the community; they love to create; to produce. It is the privilege of the art department to set a task so simplified that every little worker shall be glorified thru his work and made happy. This task should carry with it some of the mystery and secrecy of preparation for Santa's visit; and express something of the naive child spirit whose Birthday it celebrates.

The making of a Christmas card to carry a message of love, the designing and printing of a tag or seal to be used in wrapping the Christmas gift, the gift itself; these are the projects which make the best appeal to pupils and wise is the teacher who enters into the joy of making these things for as John Masefield puts it:

"He who gives a little child a treat
Makes the joy bells ring in Heaven's street."

Take the project of making ornaments for a Christmas tree—first determine materials. It is good to have something which carries over from year to year and to which can be added making a permanent collection for use. Beaver board, tempera paint and shellac will answer the requirement. The hardest task is to get suitable designs. Have pupils search Drawing Books, John Martin's Magazine, Story Books, Christmas toys for inspiration and help. Simple, bilateral designs with opportunity for brilliant coloring, and easy outlines for cutting are best. After the designs have been carefully worked out, have cuttings made in paper to be used as patterns on the beaver board. A coping saw can be used

A CARD DESIGNED AND PRINTED BY CHILDREN IN THE GRADES.



DESIGNS FOR CHRISTMAS TREE ORNAMENTS AND SEALS (LOWER CORNERS).

CARD MADE IN PRIMARY GRADE.

to cut out pattern or better yet a competent workman can cut ten or a dozen at once with the electric saw, supplying the class with many models ready to decorate. Designs should be transferred as on paper, and with tempera painted in, keeping the decorative idea uppermost. After they are thoroly dry, apply a thin coat of white shellac or varnish, place a screw-eye at the top of the miniature toy so that a cord can be tied in and fastened to tree and our project is finished. Six of these packed in an attractive box offers a very nice product for sale at Bazaars.

Seals for stickers are always good design problems and can be carried out thru the linoleum block of zinc plate. If there is a school print shop it is an especially good project. (See drawings.)

A CARD MADE IN AN UPPER GRADE.

The same may be said of the post card. It is most successful in the sixth, seventh or eighth grades. Have the designing competitive, and the best ones printed and returned to pupils for illumination. The reproductions for this article are from cards made by the pupils in Johnstown, Pennsylvania, where 10,000 were used in one season showing their popularity.

PARCHMENT LAMP SHADES

Bertha Graves Morey, Ottumwa, Iowa

ONCE in a while the make-believe things are quite as charming as the real. This is true of the parchmentized paper and the real parchment shade. There is a subtile mystery about both that is no doubt the real reason for their ever-increasing vogue.

For most mortals the price of a real parchment shade is almost prohibitive and this article will describe the parchmentized paper shade. The shade may be bought ready to decorate or one may be made from paper and treated to give the parchment effect. The ready made plan is simpler but expensive. To make one is quite as satisfactory and very inexpensive. When planning to make one it is well to remember that simple things are the best and to avoid complicated shapes.

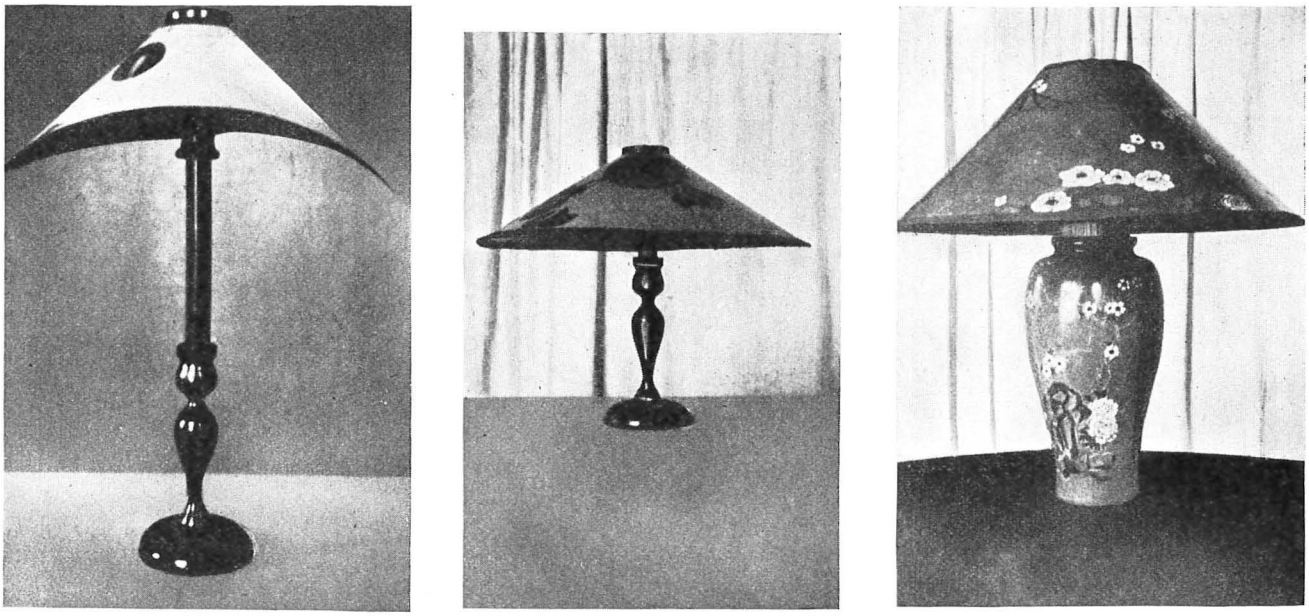
After a shape is decided upon a fitter for the lamp must be procured. Electric lamps use a top fitter and gas lamps a fitter that the shade rests on. Make an exact pattern from heavy paper. For the shade use heavy, smooth water-color paper. Draw the shape of the pattern on the water-color paper but do not cut it out, and draw or trace the design on the flat shade. If the shade is so large that pieces must be used, plan the joinings with some respect to design, three pieces are better than two and five better than four. The uneven number of equal spaces makes the most interesting shade. The design may be outlined in waterproof ink. This withstands the action of oil and water color.

Various styles of decoration are used. Naturalistic arrangements of plant forms, decorative plant forms, decorative landscape and animal forms, conventional panels and combinations of all. The shade may also be left plain and merely bound. The translucency of the parchmentized paper is interesting in itself.

Transparent oil or water color must be used to get the desired transparency for a lamp shade.

If oil is used the shade must have a coat of half-and-half hard oil and turpentine over the surface. To prepare this mix the two fluids and let stand a few days, and if there is a sediment pour off the clear part and use only the clear. After this is thoroly dry, the color may be painted in. If not intensive enough, another painting or retouching may be necessary.

When the design is dry which should be in three or four days, the shade may be cut out and the last seam glued. The opening in the top should be exactly right for the fitter. Hold the fitter in position with a few short lengths of gummed paper. Place a wire hoop



THREE DESIGNS IN PARCHMENT LAMP SHADES

around the bottom of the shade, holding the hoop in place with the short pieces of gummed tape. When in the proper position fold a piece of gummed tape thru the middle and stick over the wire and edge of the shade.

After the color is perfectly dry the whole shade is varnished with any white or very light colored varnish. A warning should be sounded that if the color is not perfectly dry the color will surely run and the work will be wasted. A test piece of paper with a few strokes of color should be used.

Oil color gives the best results but water color may be used. The paper is left untreated or as the paper was when bought, when putting on the color. When the color is on, cut out the shade and glue the seam, place the fitter and base wire as with the oil shade. The half-and-half hard oil and turpentine is painted over both sides holding it up for the light to guide in covering all the dry spots. It must be saturated or the shade will be spotty. After it is dry the shade is varnished the same as the oil shade. A coat of varnish on the under side will make cleaning easier.

After the varnish is dry the edges should be bound. Braid is the most serviceable and black silk, silver or gold are most generally used. One or the other is harmonious with most schemes. In sewing the braid, the work should be as invisible as possible, use a long stitch on the back and a very short one on top.

Principles in Choosing Sheet Metal Problems

W. H. Snyder, Jr., Lakewood High School, Lakewood, O.

THE principles which underlie the selection of the exercises and problems of any course of shopwork are the foundation upon which its success is based. If we wish shop courses to be a success, we must select exercises and problems that will tend to create a desire, on the part of the student, to learn and that will be an incentive for him to attain as much knowledge of the subject as it is possible for him to get. Is it not true that quite frequently the student becomes discouraged in a branch of work because the exercises and problems are of no interest to him? I think this is especially so in the seventh and eighth grades, and in the first year of high school work; and this is often the reason why a student who is technically inclined, changes to an academic or professional course and this change sometimes results in a disappointment in the boy's life. I shall here describe briefly some of the principles which, in the writer's opinion, should be employed in selecting and designing exercises and problems for the sheet metal shop.

Character of Student's Previous Work.

First. The nature of the shopwork and drawing the student has had previous to entering the sheet metal work, should be considered. In most cases, where sheet metal work is taught in the junior or senior high school, it is apt to follow woodwork, and is thus the first metal work which the student undertakes. The texture of the material is different, and the tools and machines are different. Therefore, I hold that it is very important that the simplest and most effective exercises and problems be given, and they should be designed to enable the student to complete them with as little discouragement as possible, and at the same time, lead him to higher and more difficult work. It is much better for the student to make a success of some small article than to

start a large piece of work in which the boy makes a failure, and thus becomes discouraged in the work as a whole.

Preparing a Sheet Metal Layout.

In laying out a piece of work in sheet metal, it is very often necessary to do quite a little drawing. When it is possible, the shop layout should be made first on paper, and then transferred to the sheet metal. In either case, the instructor should consider the nature of the drawing that the student has previously had, and then he should select for his first few problems, something in which are involved methods that the student is familiar with. After these have been completed, the boy should be gradually led to methods and terms used in sheet metal drawing, and at the same time should be brought to realize that the correct appearance and shape of the finished problem all depend on the correctness of the layout, or stretchout, as it is termed in the sheet metal shop. He should be trained to see that the size of the finished object all depends on the length and width of the flat piece of metal or stretchout. The blue prints, or drawings, of the problems which are submitted to the student to work from, should be made as simple as possible so as to give him a clear vision of what he is to do.

The Preliminary Problems.

Second. The nature of the first exercises and problems should be such as to give the student the uses of the various tools used in laying out and cutting sheet metal. On laying out a problem in sheet metal, it is desirable that all the working tools such as the scriber, prick punch, dividers, steel square and hammer be used. It is the correct use of these tools with which we should first acquaint the student. Teach him to use the scriber as he would a pencil, that it is used for drawing all lines and marking dimensions; that the prick punch is used for defining, or locating, a certain point definitely, and that it is used in transcribing from paper to the metal; that the dividers are used for making circles, dividing a circle into a number of equal parts, and stepping off a number of equal spaces; that the square is used to square up the metal, to measure off dimensions and to be used as a straight edge; and that the hammer should be used in connection with the prick punch. The student's next step is that of cutting out the piece that he has laid out on the metal. At this time, the instructor should show the student the proper way of holding and using the snips in doing hand cutting. The exercises in laying out and cutting consist of three simple straight line figures, and four curved line figures. I have found that these serve the above purpose very well, and after completing these the student is prepared to advance in the work.

Problems Adapted for Different Schools.

In the regular school, the problems should consist of useful articles that are well known to the student and which will give him an incentive to work to the desired end. In selecting these problems the simplest articles should be given at first; after giving the student two or three exercises in the method of joining the two ends of a piece of sheet metal together, two problems such as a cylinder and a square prism can be given. In these two problems, he will put to practical use, the things he has learned in making his joints and in these problems he will get his first use of some of the machines such as the folder, forming rolls, and brake. From such problems it is easy to lead to cake cutters, tin cups, match holders, jar fillers, funnels, pint and quart measures, flared pans, tin and galvanized boxes, scrub buckets and dust pans. In offering these problems, it is well to have them made in such order as to prepare the student in the one project for the next one which is to follow. In like manner, the student can be brought to the point where he is able to make something of his own design, and to make projects of a minor nature that could be of some use to the school.

Third. In the part-time, or continuation, school the problems should be designed to meet the needs of the community in which the boy is working. By this I mean that, where a student is learning his trade in a sheet metal shop, the problems should consist of work which he will encounter in the shop, such as soldering, methods of construction, use of tools and machines, and above all, problems in laying out work. I do not mean that they should be problems of just the one kind of work that might be done in the shop where employed, but problems giving a broader vision of the trade and preparing the student for broader work after he has served his apprenticeship. If the students are working at other trades, or shops, the problems should, as nearly as possible, have some relation to their line of work. For example, if the student should be working in a plumbing shop, such problems as soldering, making roof collars, lining flush tanks, and making smoke pipes for furnaces, are problems in which the student can see the teacher is trying to help him in his everyday work. Thus, the teacher can command his interest and turn his attention to school work. From my own experience, I believe this to be one of the first things to do in continuation school work.

TITLE PAGE AND INDEX

The annual title page and index to the 1919 volume of the Magazine is ready for distribution to readers. Post card requests should be addressed to the Subscription Department, Industrial-Arts Magazine, Milwaukee, Wis.

INDUSTRIAL-ARTS MAGAZINE

Board of Editors

E. J. LAKE S. J. VAUGHN

W. H. HENDERSON

EDITORIAL

MAKING THE MOST OF IT.

THE schools are crowded beyond anticipation this year. Teachers of even indifferent preparation have been difficult to find in numbers sufficient to conduct classes. The burden falls heavily on teachers of subjects such as the industrial arts in which equipment is required, because of the size of a class is limited by the equipment as well as by the energy and endurance of the teacher. Well laid plans must be abandoned. Substitutes must be found for favorite materials. Projects that have been devised for very particular ends must be abandoned. Hours of instruction must be increased. And yet it is in just such a crisis as this that teachers of finest ability are developed.

One experienced teacher relates that he "never learned to conduct a class effectively until compelled to do so by crowded conditions." "Then!" said he, "I learned to place the responsibility for the performance of school duties, where it belongs, on the pupils. I abandoned a cherished ideal that each individual pupil should be looked after constantly. I observed the great value of emulation and competition as incentives to work. I learned that the effective teacher is not the fountain head of all information and the recourse of indifferent youth, but the *counsellor and director of efforts to accomplish a very definite piece of work.* And then too, I found that a given problem can be solved in other ways than that laid down in the book of authority. I found that there were many projects directed to the same purpose." Verily! In this uncertain business of education even a handicap seems to sometimes become an advantage over night. May we not make this year a most profitable one in that we will learn to economize time, equipment and energy!

PUBLIC FACILITIES FOR WORK AS WELL AS FOR PLAY.

REMARKABLE progress has been made in the last few years in providing gymnasiums, playgrounds, swimming pools, athletic fields, and other facilities for the amusement, recreation, and play of the childhood and youth of the nation. Practically every community has one or more of these modern institutions where every boy and girl may find an opportunity to play at any time they may feel so disposed. This admirable state of affairs constitutes one of the largest contributions which modern thought and science have made to education and social betterment.

But suppose an idle boy on the streets should suddenly decide to work a few hours! Well, that's different. He would find it necessary first to seek an employer in need of his services and bargain with him. The work that he could get for the few hours would be of the most casual and unskilled sort, and the motive could never be enjoyment, satisfaction or the interest in the effort or the product, but always simply the remuneration.

There are times when boys really want to work. In fact, there are as many hours in the day in which boys may be as strongly attracted by vigorous, wholesome, worth-while work as there are in which they may be interested in games, sports, etc. Every manual training teacher can testify to the frequent requests that come from boys to be permitted to work in the shops on Saturdays and after school hours, when they might be playing. One of the most important steps that could be taken, therefore, in the interest of education, community welfare, and moral growth would be to provide facilities for work along with those for play, in order that no desire for interesting occupation might be denied to any boy.

Perhaps the time will come when in connection with every playground and place of recreation, there will also be ample facilities under competent supervision for a great variety of profitable, interesting, and inspiring lines of work. It is not just a play on words to say that, at least frequently, knowledge, skill, and the fine attributes that come with education are "caught, not taught." When the vast majority of children leave school without completing the eight grades of the elementary school, it is high time to begin to think of catching them whenever and wherever and however it may be done.

MODERNIZED MANUAL TRAINING NEEDED.

ALL high grade teaching is difficult. None of the plans for lending flexibility to courses of study or for taking advantage of the pupils' interest and initiative is easy of execution. The excuse of a teacher that suggested improvements are "all right, but too difficult to carry out" might be due to incompetency or indolence.

The teacher who says, "I tried it once and it failed," may be exposing more than he thinks, for that is not a sure sign by any means that the scheme is faulty. Somebody fails with every scheme. If the principle is admittedly right, then one should be very cautious in admitting his failure in applying a correct principle, lest he reveal his own incompetency before a fair trial has been given. Such an attitude can be likened to that of one who condemns a tried and tested rifle because he tried it once and missed the target.

Every suggestion for the liberalizing of manual training meets the reactionary tendency of the few who still cling to the lifeless, cut-and-dried plant stick, hat rack, bread board, coat hanger "models." It is interesting to observe with what naive tenacity some still hold

to the notion that their ready-made, dictated, and carefully specified "models" would immediately lose their educational value, if they were modified or influenced in the slightest degree by the interests or the needs of the pupils of the class. It is this disposition that is now causing the manual training work to be challenged again to fight for its life and to show cause why it should not be discarded.

In defense of the manual training work, it should be repeated as often as possible that in general it is becoming modernized and made to fit in with the movement and needs of the times. The best friends of manual training are anxiously hastening the time when lists of abstract and useless and uninteresting "models" will give way to vitalized problems that are significant in the lives of the pupils and that will arouse a genuine enthusiasm. Such work will not only enrich the lives of numberless boys but will also lengthen the life of manual training itself.

THE FUTURE.

THE most interesting direct result of the Great War on school affairs is the return of so many of our boys with the determined resolve to continue their school training. The value of such training has become large in their widened vision of affairs. They have seen a little training go a long way toward the success of the soldier citizen in the affairs of war. They have a greater appreciation of school training, having seen evidences of successful operation in many lines of work that found origin in our schools. The great business of war is proven to be quite as dependent on school training as on military training, and school training cannot be acquired in a few months. Then, too, our own American schools have "loomed large" in the minds of our boys, together with the other home institutions, when seen from foreign shores. It is proverbial that "to appreciate home, one must travel abroad."

We have recently heard the experience of an American lecturer who went to the American military camps of France to help our soldiers appreciate the artistic heritage of that great republic. This lecturer has a most fascinating personality and has never failed to hold his audience on subjects of Art. Yet he tells us that when he stood before gatherings of Doughboys in France and referred with the conviction of long acquaintance and study in that land of artistic accomplishment to "beautiful, sunny France," he was met with howls of derision.

"Lead us to little old New York; America is good enough for us!" shouted the American Doughboys in France. It was not in the situation to impress the American soldier in France with the peculiar beauty and interest of that foreign country, but it was in the situation for him to acquire a new appreciation of his home institutions.

The great increase in our school attendance brings with it the responsibility of making our schools more than ever efficient. In response to this new born appreciation we must make the schools effective in normal, active results on the busy life of our people. The schools must be made training centers for every occupation as well as agencies for the uplift of educational standards. Industrial Art has a great future in America.

CONTINUATION SCHOOLS IN NEW YORK.

New York City is organizing continuation schools for children between the ages of 14 and 16 who are engaged in profitable employment. The compulsory education law will not go into effect until September, 1920, but the board is now making plans for the schools and has already organized a considerable number of classes to which children may come voluntarily. An appropriation of $90,000 has been asked for the work.

In discussing the new law Superintendent Ettinger recently said:

"With the underlying principles and purposes of the law there can be no disagreement. Wisconsin and Pennsylvania for some time have had statewide compulsory continuation class laws. In Massachusetts, Boston has conducted an excellent system for continuation classes since 1914. Germany, altho the aims of her educational policy are to be condemned, has worked out an excellent system of such schools. In England and Scotland they have been conducted on a voluntary basis, and under the Fisher act they will be more highly developed than anywhere else in the world.

"The war has shown the need for continual education. In our own experience, the evening school attendance by young workers on a compulsory basis has been found impractical of enforcement, and on a voluntary basis it has been limited to the number of persons reached. It is estimated there are 200,000 working children under 18, who have not completed the high school course, of whom few attend the evening elementary or high schools. In fact, it is estimated that 95 per cent of this number are not attending schools of any kind, public or private.

"The effect of the schooling these young workers have obtained, especially those who have not finished the elementary schools, is rapidly worn off and in a few years, unless the knowledge gained in the schools is used in business it becomes lost. Actual observation in department stores have shown that the boy or girl who left school at 15, without graduating, is not equal at the age of 17, in educational studies of a child of 12. If the educational equipment obtained by each child in school is not kept up afterward, it is doubtful whether the money invested brings sufficient returns in terms of intelligent citizenship."

"Much of the present unrest is due to the instruction received by boys and girls between the ages of 15 and 18 from demagogs and preachers of discontent. A systematic effort should be made to bring them into contact with sound doctrine and wholesale mental stimulus. Another reason is the prevention of the waste caused by drifting from job to job, a practice which can be affected favorably by vocational guidance. It is estimated, that 2,000,000 young workers bring to their families $2,500,000 every week. If society demands such returns from its young workers, surely they are entitled to a return in the form of education to the extent of 2 per cent of what they earn. In other words, what they earn in one week would pay the cost of continuation schools for a year."

Racine, Wis., will shortly vote bonds to the amount of $125,000 for a new vocational school. Construction work on the building will begin next spring.

Camp Grant, Ill., has been designated by the war department as an automotive training center for the army. It is planned to train all the drivers, chauffeurs, and dispatch riders at this center, which has been selected because of its close proximity to Chicago, Detroit and other automobile centers.

Little Arguments on Great Principles

ACCOMPLISHMENTS

"You are getting down to work earlier than before the war, Mr. Frills," commented Try Square as Frills took his seat before a pile of drawings on his desk. "What is the incentive that makes an artist get up before eight o'clock? Are you painting sunrises?"

"No-o," drawled Frills, "I haven't painted a stroke this whole season, and if this rush keeps up I shall lose all visions of an artistic career and get into the routine of daily chores like the poor cobbler in the basement around the corner, who seems to never be able to reduce the pile of shoes on his bench."

"'Poor cobbler?'" snapped Try Square. "Say! Do you know that fellow owns the store block over his head?"

"So?" commented Frills indifferently.

"Yes," continued Try Square, "and he tells me he has three sons in college who have just returned from the service. He is a wonder!"

"Well, you may call him wonderful if you like," replied Frills, "but I contend that the measure of a man's success is not his material accomplishment, but his mental development and outlook."

"'Mental development and outlook' is a fine phrase, Mr. Frills. It reminds me of poor old Professor Pipkin, who used to lecture us on the spiritual and mental development of the race. He used those very words, 'mental development and outlook.' By the way, Frills, have you received that circular from the College Association, soliciting a contribution for the old gentleman? You know the professor wandered from college work into lecturing on the social millennium wherever he could find an audience. Now he is down and out and needs help to keep his family from poverty."

"Too bad! Too bad!" deplored Frills. "He was a wonderful man—a great mind, with a grasp on a philosophy of life that is rare in this sordid and materialistic age."

"Yes, yes. I suppose so," said Try Square absently as he gazed down in admiration at his neatly mended shoes from the skilful, industrious hands of the old cobbler around the corner. "But mental development and outlook without skill and industry seem to fall short of success. The professor worked on our heads and seems to have left them unfinished; the cobbler works modestly and persistently on our feet, and I contend that he is a wonder among men and a great success. Lets go to work!"

TOYS MADE IN IONIA, MICH., FOR THE POOR CHILDREN OF THE CITY.

MADE IN IONIA—NOT GERMANY.

Percy Angove, Ionia, Mich.

In some of our Manual Training departments in previous years we have somewhat encouraged toy making on a small scale, more from the standpoint of the specific exercise than from production. Not so in Ionia last year, because the boys from the sixth and seventh grades could not imagine themselves, or any other child, staring at the imprint, "Made in Germany", and realizing that many of the poor children of our city would be minus a toy to make their stocking complete, it was decided that we make toys on a productive basis, adopting for our slogan "Each boy make at least one poor child smile at least once this Christmas." It was carried out in the following manner:

The classes were evenly divided up at each period according to bench numbers, with certain groups of boys making certain parts, and the work was so changed around that every boy had a hand at every part, which of course was necessary to retain the interest once aroused.

A template of each toy was first cut from paste board and the steps involved in the different groups were as follows,—marking out, making bottoms (from scrap lumber), cutting wheels, cutting the toys, gluing, sand papering, painting and enameling.

It was thought best to confine ourselves to the making of eight different toys, which were as follows:

Duck on wheels; Goose on wheels;
Chick on wheels, conventional;
Robin on wheels;
Bear on wheels;
Horse on wheels;
Elephant on wheels;
Owl and Moon match holder and scratcher;
Elephant match holder and match scratcher.
Picture frames.

Different sizes of each part were placed upon the boards for the pupils to work from, and great emphasis was laid upon the fact that each boy's part and time were depending entirely upon the other fellow.

The cost was covered in this way. Each pupil paid for one toy, which was from the average of three to five cents each, because most parts were made from waste material and wood from boxes. The shop was a busy place. To see the smile upon the energetic faces of the boys while at their work, told one very plainly that no true American boy intended to let Germany think that he had to depend upon her for good strong toys.

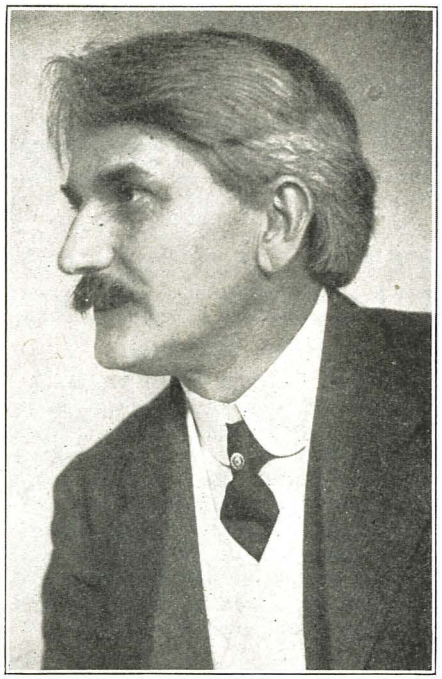
On the opposite page is a photograph of only a few of the toys made.

MR. FROEHLICH APPOINTED.

Mr. Hugo B. Froehlich has just been elected principal of the Fawcett School of Industrial Arts of Newark. This school is one of the four industrial art schools of the country and is a public institution.

Mr. Froehlich is known thruout the United States for his vigorous advocacy of industrial art education and his election to the Newark school is most fortunate. He is a native of Ohio, a graduate of Pratt Institute and has taken advanced art study in the United States and in Europe. He has been an instructor in design and applied art at Pratt Institute, and of design and the crafts in the New York School of Fine and Applied Arts. He is especially well known to teachers because of his work as art editor for the Prang Company and as director of the Summer School of Industrial Art of Chicago. During the past five years he has been Director of Manual Arts of the Newark public schools. He has been a frequent contributor to educational magazines and has written a number of the most popular art textbooks in use in the United States today.

The Fawcett School of Industrial Arts has exerted a wide influence. The school has a teaching force of thirty instructors and an enrollment of 900 students. Its policy is to teach only such subjects as have a direct bearing on the industries. The courses are entirely laid out for the sake of utility and its graduates hold positions as architects, architectural draftsmen, jewelry designers, commercial artists, costume designers, interior decorators, art instructors, illustrators, etc. The curriculum includes architecture, mechanical drawing, jewelry design and making, commercial advertising, die sinking and engraving, naval architecture, ship construction, interior decoration, ceramics, normal art instruction, illustration, etc.



MR. HUGO B. FROEHLICH,
NEWARK, N. J.

DIFFERENCE BETWEEN HEARTWOOD AND SAPWOOD.

In over 300,000 tests which have been made at the Forest Products Laboratory, Madison, Wis., on the various species of wood grown in the United States, no effect upon the mechanical properties of wood due to its change from sapwood into heartwood has ever been noticed. Any difference in the strength of heartwood and sapwood can usually be explained by the growth and density of the wood.

In other than mechanical properties, there are differences between heartwood and sapwood which have an important bearing on their use for various purposes. The sapwood of most American species is considerably less resistant to decay than the heartwood, and where the wood used without preservative treatment in situations which favor decay, the sapwood is likely to have a much shorter life. In these particular cases, therefore, strength requirements may have an indirect bearing on the choice between heartwood and sapwood, inasmuch as wood infected with decay is likely to have its strength properties, particularly that of shock resistance, greatly reduced.

UNEVEN COATINGS ON WOOD CAUSE WARPING.

Coatings of equal moisture resistance should be applied to all surfaces of a wood product which would give dissatisfaction if it were to warp in service. Tests at the Forest Products Laboratory have shown that even when wood is properly kiln dried no coating entirely prevents it from picking up or giving off moisture and, consequently, from swelling and shrinking under the influence of varying atmospheric conditions. Varnish, shellac, and other moisture-resistant finishes merely decrease the rate at which the moisture changes in wood occur. The higher the grade and the more coats applied, the slower will be the moisture changes.

Unequal coatings on opposite surfaces of a wooden article cause unequal rates of change in moisture content and hence unequal shrinkage on the two sides of the piece. The result is that the wood tends to cup or twist out of shape.

PROBLEMS AND PROJECTS

WANTED: THE BEST OF PROBLEMS

What have been the most effective problems and projects made in your classes? Why have they been successful? In what way have they been best?

The Industrial-Arts Magazine is interested to learn what problems instructors consider their "best" and to publish a selection of those received in the Problems and Projects Department during the coming six months. For the "best" each month a check of $10 will be sent; for the second best, $7; and for all others, space rates will be paid. Problems will be judged on the basis of technical excellence, educational value, originality, utility, design, finish, beauty, economy. The editors of the Magazine will be the judges.

All problems submitted should consist of a black-and-white working drawing, or a tracing, a description of not more than 300 words, and if convenient, a photograph. The description should include a statement of the particular points which made the problem successful and such details as are needed to make the construction and finish of the article intelligible to shop teachers.

Problems in bench work, machine shop, patternmaking, cooking, sewing, millinery, forging, basketry, book binding, printing, leather work, pottery, cement work, cabinet making, woodworking, etc., are acceptable.

Problems may be submitted at any time up to December first, and any person may send as many as desired.

Address all correspondence to Managing Editor, **Industrial-Arts Magazine,** 129 Michigan Street, Milwaukee, Wis.

GOO-GOO-TIM.

Michael C. Dank, Brooklyn, N. Y.

Come, boys, get out your tool-kit and make this very amusing toy called "Goo-Goo-Tim". Look over the working drawing and follow these instructions:

To make the parts—Get any thin board of wood, strong and fine-grained, which should measure about 12″ square and ¼″ thick. Cigar box wood will do very well. On this board mark out the different pieces with their features drawn as shown in the drawing. The head and body, you notice, are made of one piece and with two ears, we have but three parts all together.

To saw—In figure A of our drawing, we find a board which is 14″ long by 7″ wide, with a notch cut out at one end. If you nail or screw this board to any old bench or work-table, you will then have a very good arrangement for sawing. The saw used, is shown in Fig. B. Saw out the three parts carefully and then sandpaper the rough edges. To saw out the two eye holes, insert one end of the saw-blade in a hole made with an awl and then place saw into frame again. After sawing, bore all the awl-holes as indicated.

To paint—Go over the pencil outline of the features and then paint each piece separately. You can use either water-colors, crayons or, for an excellent finish, dry colors mixed with white shellac.

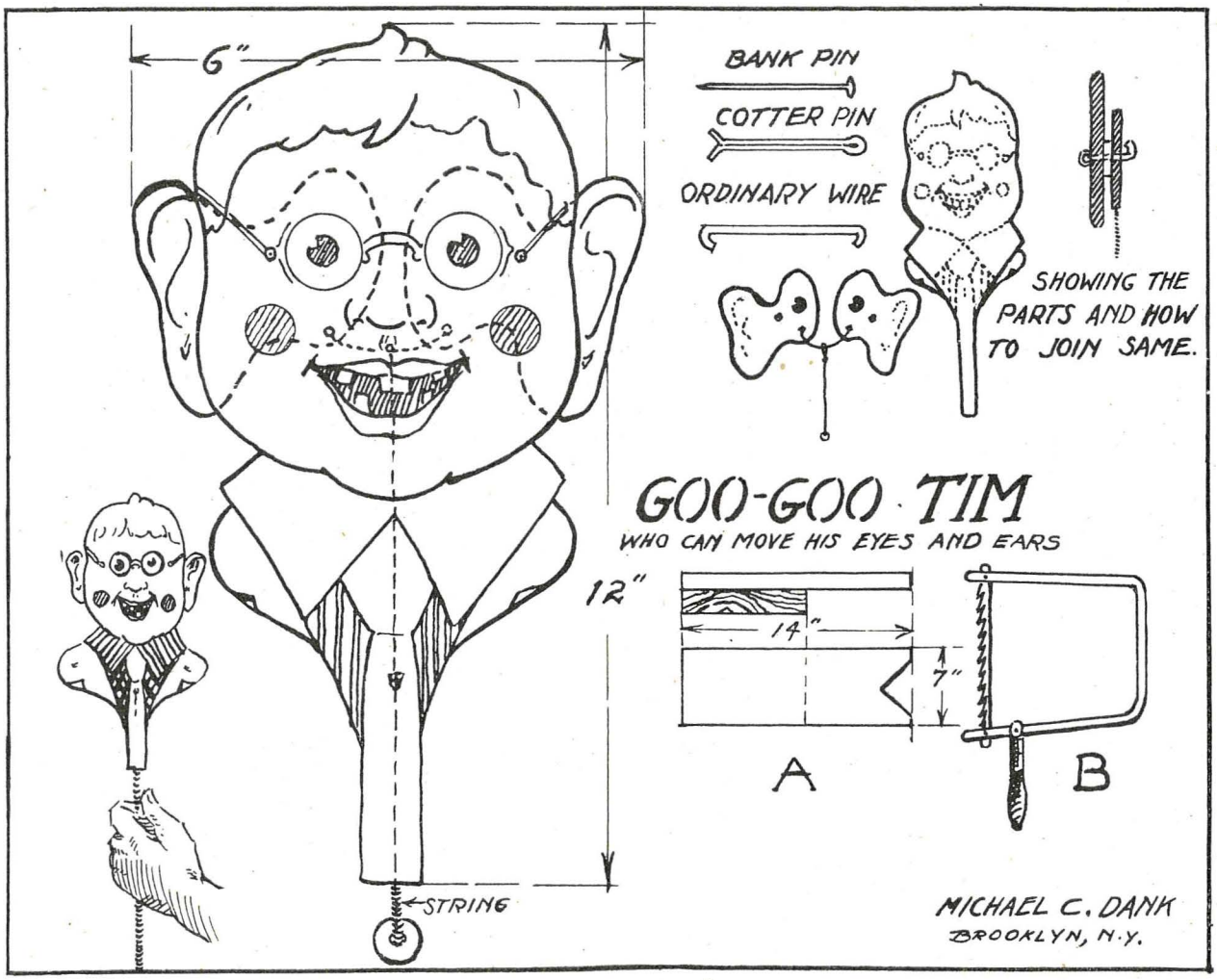
To assemble—Wait for the paint to dry and then using either bank-pins, cotter-pins or ordinary wire, as illustrated, join the parts together. Attach string to ears as the drawing shows, and tie a longer string to it which is to be pulled by the hand.

To operate—Pull string up and down and Goo-Goo Tim will move his eyes and ears in a most amusing way.

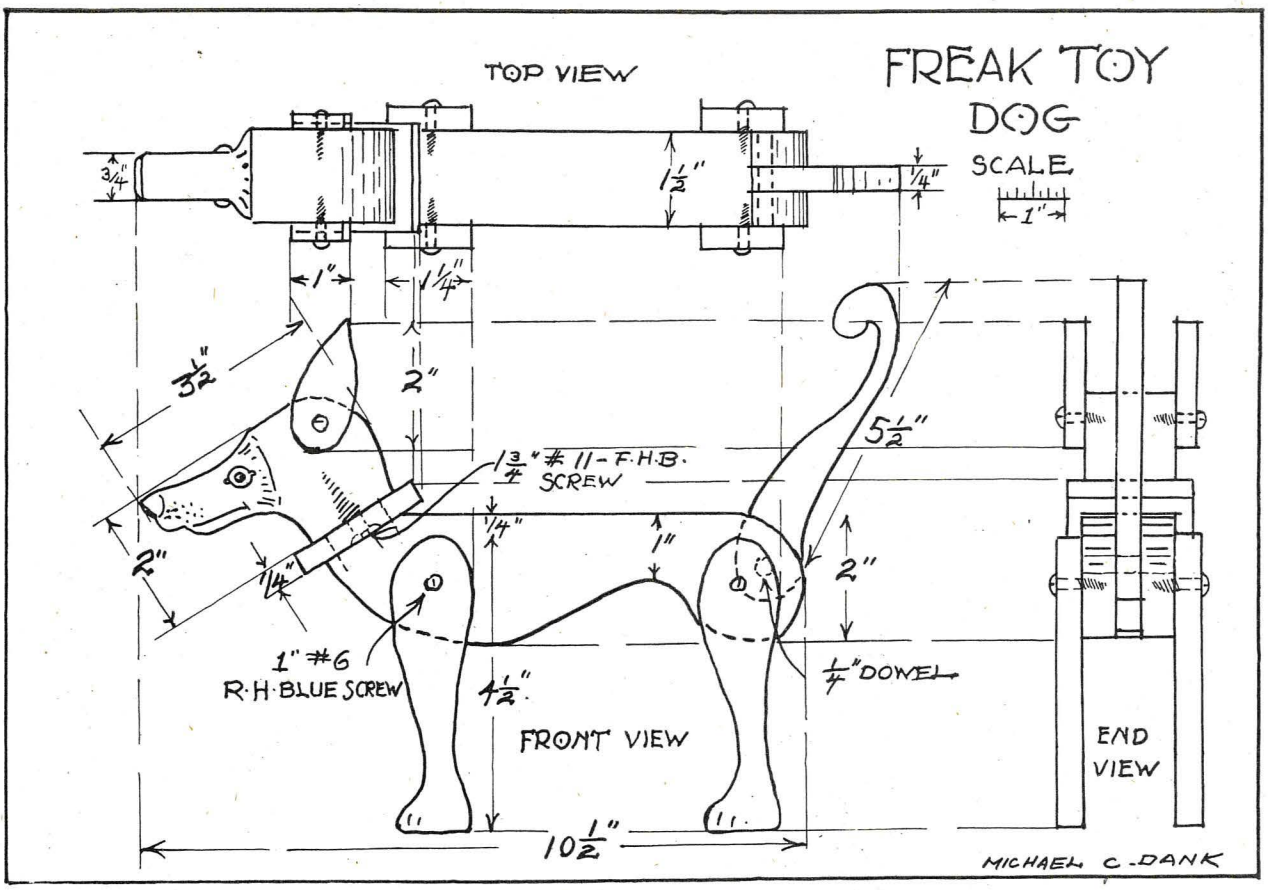
"FREAK TOY DOG."

Michael C. Dank, Brooklyn, N. Y.

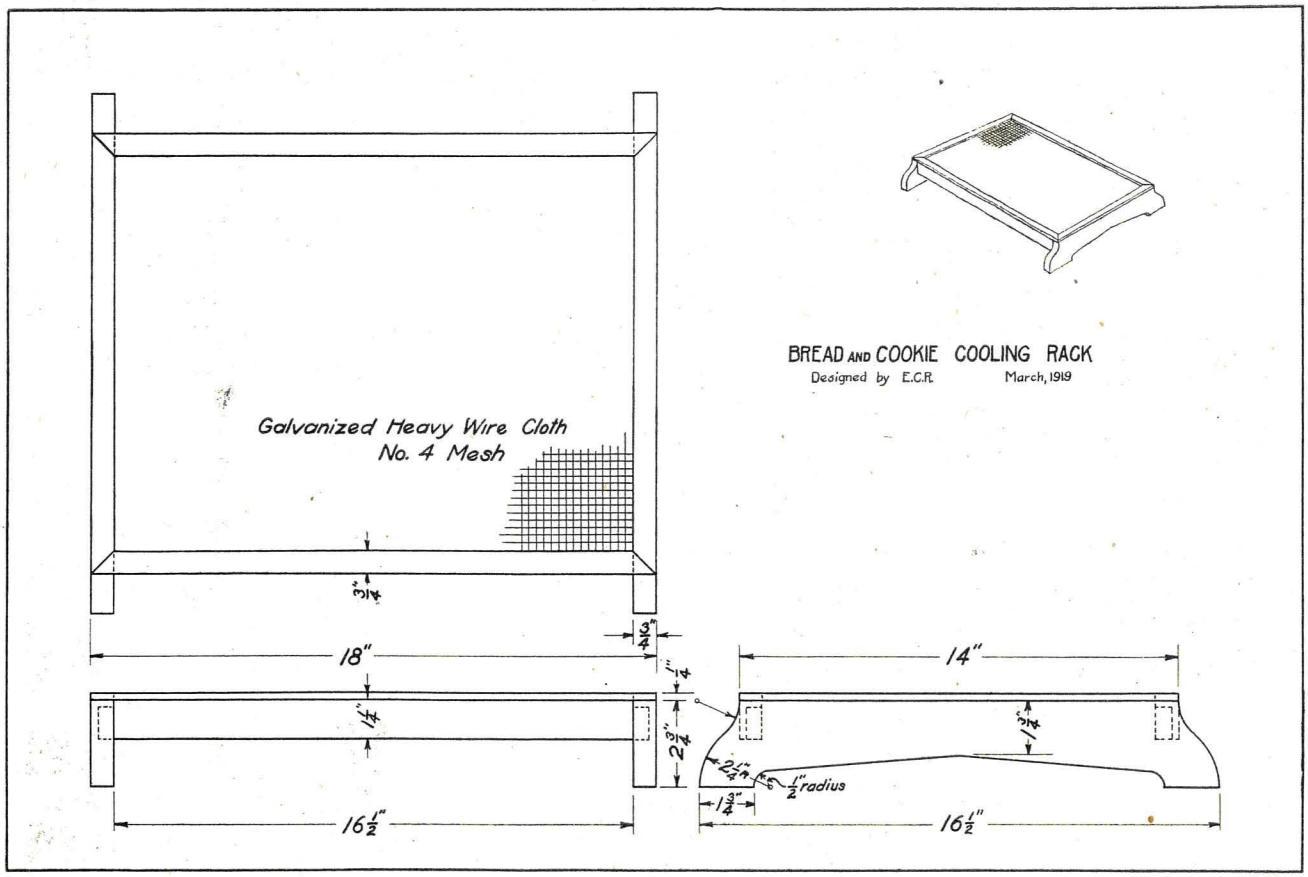
Head and body—The head and body are both cut out of 2″x2″ stock, either pine or white wood will do very well. Square up sides of block and then plane for a thick-



DETAILS OF JUMPING TOY.



DETAILS OF TOY DOG.



DETAILS OF COOLING RACK.

A TURNED PAPER WEIGHT.

ness of 1½". The head and body, having the same thickness, should be worked from one piece. An eleven inch strip will cover both parts. The patterns for the head and body are now applied to the block and their respective outlines are traced. The ears, for which 3/16" stock is used, and the tail and legs which require ⅜" stock should then be marked out, using the patterns in a similar way. Using a coping saw, cut along these outlines very carefully and when finished, sandpaper the parts thoroly. The groove for the tail should now be chiseled out according to the drawing and this may be followed by boring holes, with a small gimlet bit, in the legs and ears for assembling. The tail swings on a ¼" dowel piece, and the necessary holes should be bored for same. Round head screws are used for assembling which should not be done until after the painting is finished.

Painting—A good color scheme should first be decided upon before starting to paint. A good paint can be had by mixing dry colors with white shellac. If found too thick, the mixture can be diluted with denatured alcohol. When colors are all dry, a fresh coat of shellac can be applied to brighten up the problem.

A PAPER WEIGHT.

By J. W. Heatley, South Hills High School, Pittsburgh, Pa.

The accompanying problem illustrates an exercise in turning. Red Gum or maple, finished with linseed oil and shellac, are desirable materials. The glass discs can be obtained for three cents each. Number 12 steel spring wire is inserted in the groove to hold the glass.

The school seal was designed in our art department. A plate was made from the original and prints in the school colors were obtained.

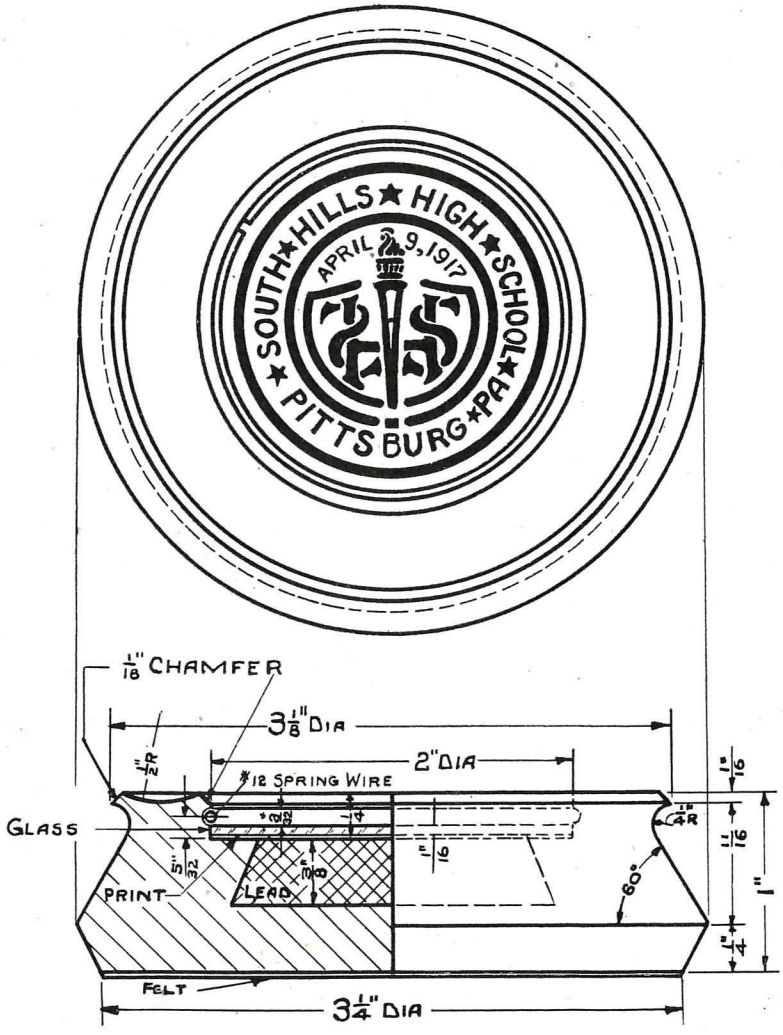
The design is ideal for a productive problem inasmuch as it can be turned, weighted with lead, assembled, and finished without rechucking or removing from the face plate.

The shop classes made 300 of these weights during the holidays of 1918 which sold for 25 cents each. The proceeds were turned over to our Junior Red Cross fund. This paper weight makes an ideal favor for Manual Training Conventions, etc.

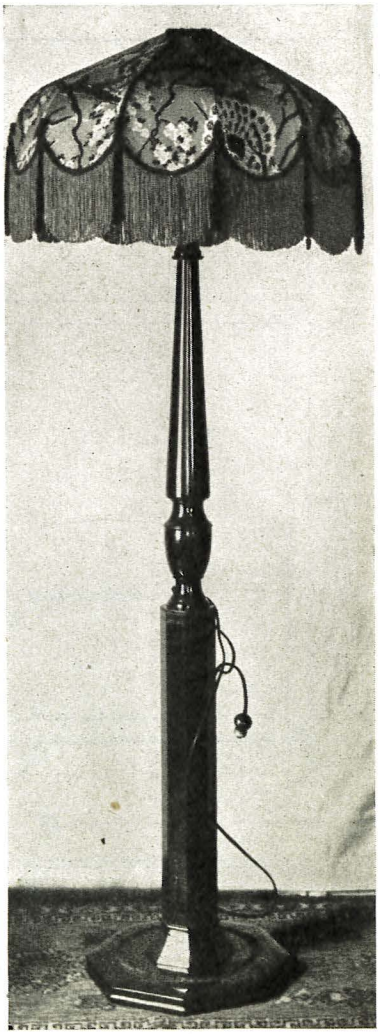
A BREAD AND COOKIE COOLING RACK.

E. C. Rose, Supervisor, Dover, Ohio.

The bread cooling rack illustrated in the accom-



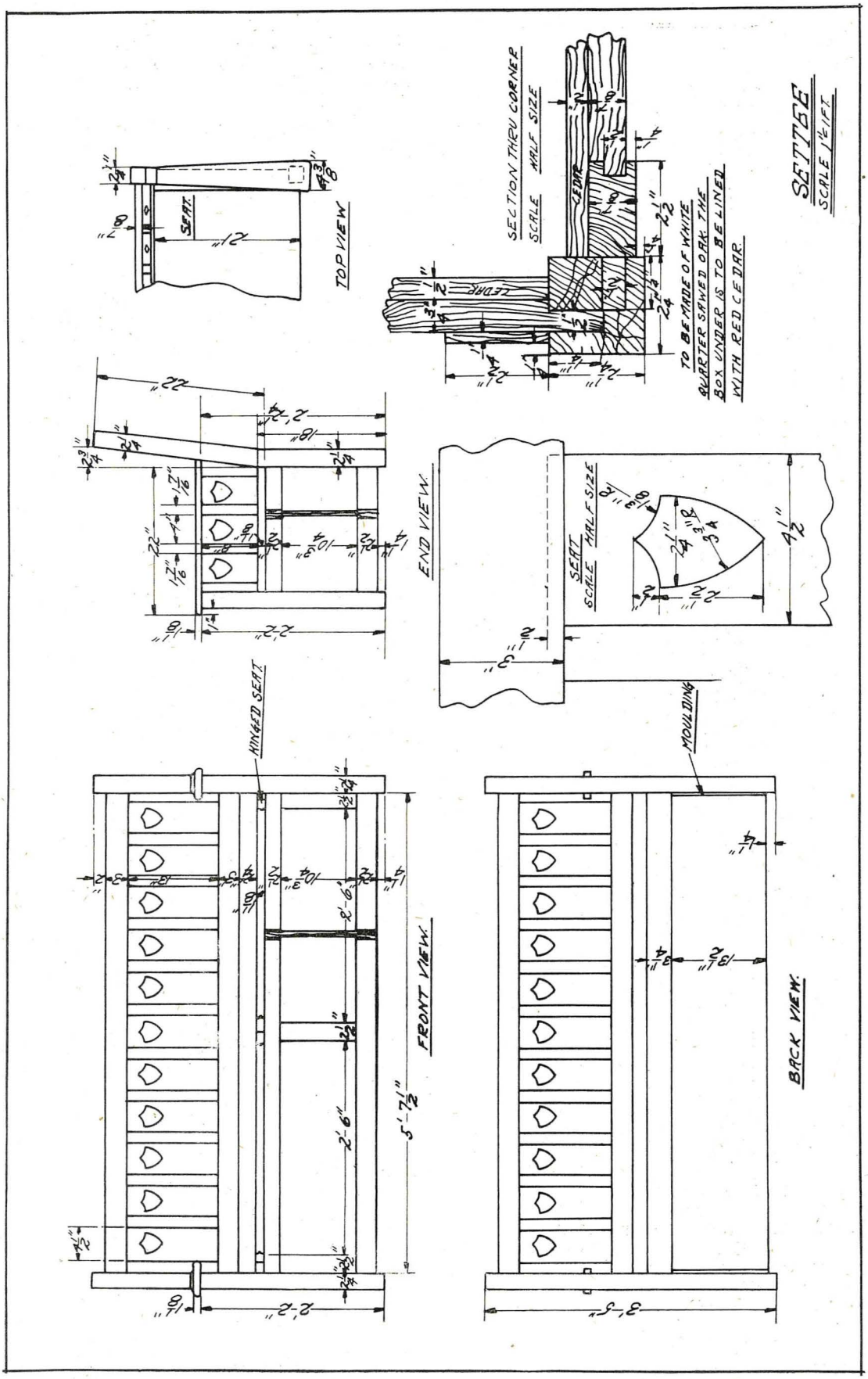
PAPER WEIGHT



THE COMPLETE LAMP.
See Pages 507-509.

panying drawing has been found to be very satisfactory for either seventh or eighth grade work. The construction can be simplified by using a butt joint, for joining the frame, instead of the housed joint as is shown. Copper wire cloth may be substituted for the galvanized wire cloth. The material may be of any soft or hard wood and finished natural color with two or more coats of shellac.

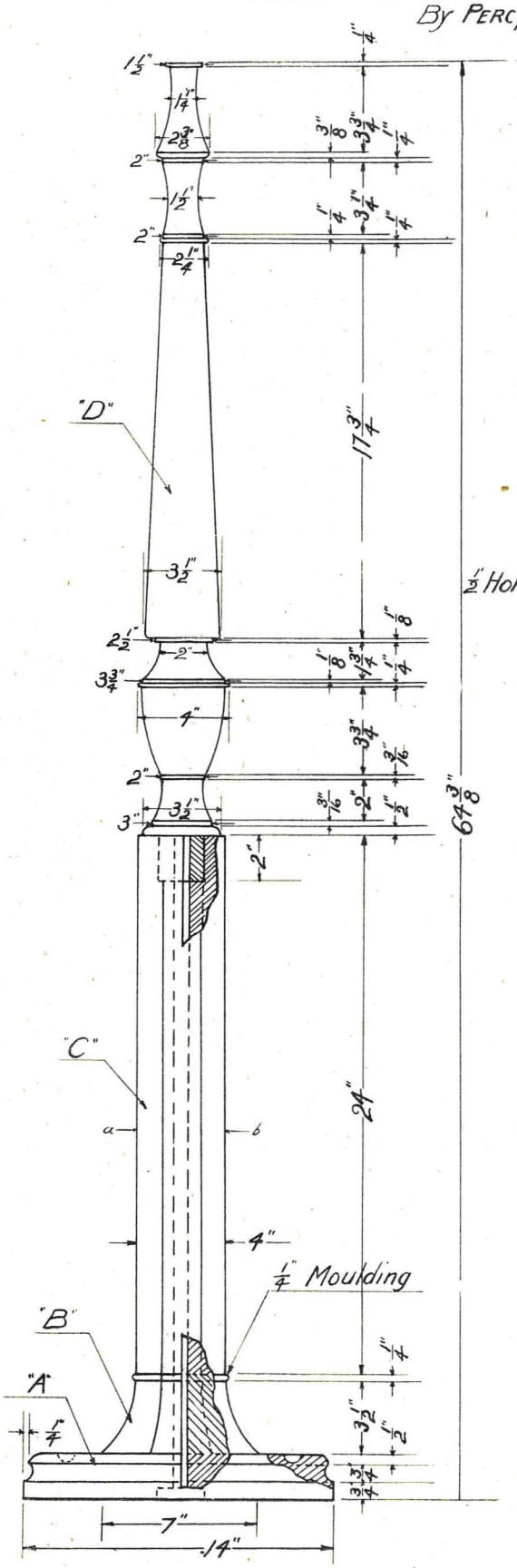
The finished piece has ready sale at school bazars, and has proven to be one of the most popular of our series of kitchen-utensil projects.



FLOOR LAMP

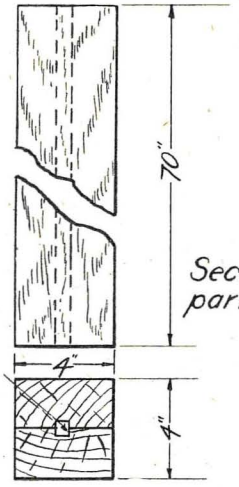
ASSEMBLED AND DETAIL DRAWINGS

By PERCY ANGOVE. IONIA, MICH. Scale $\frac{1}{4}$" = 1".

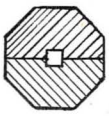


NOTES

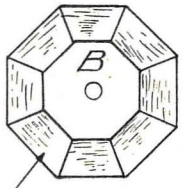
A and B are joined together by means of glue and screws.
B and C are joined by means of dowels.
C and D are mortised together.



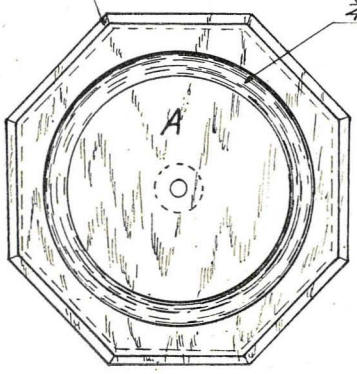
Method of Glueing C and D.



Section through part "C" at a-b.



Top Views of parts A and B.
Octogan Construction.



NOW, ARE THERE ANY QUESTIONS?

This department is intended for subscribers who have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from competent authorities. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Furniture Making.

968. Q:—We have no turning lathe in our shop, and now that William and Mary, Louis XVI, Queen Anne and other designs of furniture are supplanting the mission style, we are at a loss to know what to suggest to our high school boys to make in wood working classes.—*J. M. S.*

A:—While a lathe would form a most valuable addition to the correspondent's shop, the lack of it is no reason for not making beautiful and useful pieces of furniture. These need be neither exact reproductions of the period styles or copies of the socalled mission. The possibilities for good designs which require no turning is almost infinite. The back issues of the *Industrial-Arts Magazine* and of the Manual Training Magazine contain hundreds of suggestions. Material can be found in quantity also in such books as: *Otter's Furniture Design for the Craftsman*, $1.50, David Williams Co., New York; *Crawshaw's Problems in Furniture Making*, $1, Manual Arts Press; *Practical Furniture Making*, $1.25, L. C. Dewey, Denver, Colo.; *Griffith's Advanced Projects in Furniture Making*, $1, Manual Arts Press; *Rush & Conway's Shop Work*, Industrial Book & Equipment Co.; *Windoes' Cedar Chests*, $1, Bruce Publishing Company.

The situation suggests also the possibility of undertaking practical projects of community interest and vocational value in carpentry, farm woodwork, concrete, etc., and of casting about for new lines of work which require easily obtainable or homemade equipment.—*C. H. B.*

Dictionary of Mechanical Terms.

981. Q:—Will you please send information concerning a dictionary of mechanical terms?—*R. B. K.*

A:—*Colvin and Stanley's American Machinists' Handbook*, $3, McGraw-Hill Co., New York; *Schloman's Technical Dictionary*, Vols. I and IX, McGraw-Hill Co., New York; *Lockwood's Dictionary of Terms in Mechanical Engineering*, $3.75, E. P. Dutton & Co., New York; *Ross's Dictionary of Technical Terms*, $0.50, E. P. Dutton & Co., New York; *Colvin and Stanley's Machine Shop Primer*, $1, McGraw-Hill Co., New York.

Army Trade Tests.

989. Q:—Where can the writer obtain the army trade tests referred to in Mr. Wardner's article in the October Magazine?—*C. P.*

A:—The tests used during the war were prepared by Dr. Walter B. Bingham of the Carnegie Institute of Technology, Pittsburgh, and are now available in the two-volume report on the Personnel System of the Army. The book sells at $1 and is in stock with the Superintendent of Documents, Washington, D. C.

Col. Roger S. Fitch, in charge of the Educational Section of the general staff, states that vocational standards and tests are now being developed for permanent use in the army, but naturally are not yet available.

NEW BOOKS.

Primary Seat Work Sense Training and Games.

By Laura Roundtree Smith. Cloth, 160 pages. Price, 60 cents. Beckley, Cardy Co., Chicago.

Systematic, progressive work in sense training is given in these exercises for primary seat work.

Imitation work, paper folding, cutting and construction, clay and sand modeling, weaving and sewing, are important activities. Good foundation work in reading, phonics and spelling, numbers, has not been forgotten. These exercises provide seat work in the kindergarten and also train little folk for work in the future.

Applied Science for Wood-Workers.

By William H. Dooley, B. S., A. M. Cloth, X and 458 pages; illustrated. Students' Edition, $2.00. The Ronald Press Company, New York.

Teachers of shop work have long complained that the science courses in the average high school do not make any effective opportunity to impress the principles of physics, chemistry, etc., by applications from real life, or even from the work of the school shops which are right at hand. Pupils thus fail to see any utility in the laboratory work and they are hampered in their shop practice by a lack of understanding of principles which are constantly employed.

The present book offers an elementary course in physics, chemistry, and mechanics, such as woodworkers of all classes need. It adds chapters on the materials, tools, machines, and forms of power commonly used in carpentry, cabinetmaking, etc. It thus combines the general and special science which the woodworker requires and makes both usable by contant cross reference and illustration from every day practice.

IN DEFENSE OF REEDUCATION WORK.

The Federal Board for Vocational Education has been severely criticized recently for failure to promptly and adequately take care of the training of disabled soldiers and sailors of the late world war. It is brought out that, altho fifteen months have elapsed since the passage of the law and the establishment of the board, not more than 8,000 of the 250,000 service men have been started on their training. Only 33 have been given complete courses and actually placed in the industries. Out of 170,000 men who have made requests for training, only 23,000 have been recommended and only 7,800 have been actually put in training. It is charged that the board has exhausted appropriations totaling $16,000,000 and is prepared to ask for $21,000,000 more within a short time.

The Federal Board for Vocational Education, thru Mr. James P. Munroe, vice-chairman, has issued a statement in defense of its administration of the law for the rehabilitation of wounded soldiers and sailors. He says in part:

"The facts indicate that there are between 35,000 and 50,000 disabled soldiers, sailors and marines who will apply for, and will be found entitled to, training under the rehabilitation law Of the 50,000 men who may ultimately be found entitled to training, 25,000 have already been cared for by the Federal Board and arrangements are being provided for their training. More than 13,000 are now being educated and they are being placed in training at the rate of 1,200 per week. Thousands who are among the 25,000 who are not yet in training, are 'visiting their parents,' have been tempted by an immediate job, or are waiting until the institution to which they have been assigned can receive them. Every one of the 25,000 is receiving, or as soon as he decides to take his training, will receive $80 per month if he has no dependents, or a salary allowance up to a total of $150 per month if he has dependents.

"Over 20,000 soldiers are still in hospitals under military control. Under the law, the board may not begin the education of these men until they are discharged from the hospitals.

"Another large proportion of the 50,000 needing to be trained, have tuberculosis and it would be murderous to train them while the disease is in the active stage.

"Another large percentage of the 50,000 is made up of men discharged before June 27, 1918, or between July first and December 11, 1918. To men of the first group the law did not apply until July of this year, while those of the second group went into civil life without a knowledge of the rehabilitation act. Men of both classes must be picked up and surveyed by one of the agents of the board.

"The oft-repeated lie that only ten or twelve men have been placed in jobs is unfounded. Thousands of places have been found for men whose disabilities were so slight that they did not need re-training. Of graduates, there are very few because the board is giving genuine training and the average length is ten months. Many boys are booked for training for periods extending from one to four years.

"The subsistence, tuition, supplies, etc., for each disabled man in training average $1,500 per year. By July 1920, there will be 35,000 men in training."

In concluding this statement, Mr. Monroe declares "the Federal Board is absolutely non-political. Unjust statements do not injure it, but carping and uninte criticism, based on misinformation, seriously injures the disabled man."

FLOOR LAMP.

By Percival Angove, Instructor of Manual Arts, Ionia, Mich.

Perhaps there is no piece of furniture that gives more comfort and especially adds to the beauty of a room as does a well balanced floor lamp, provided of course that it matches and coincides with the rest of the furniture. And most decidely it is a very practical article.

The accompanying drawing and photograph illustrate a lamp that was designed and made up by the author. It cost, including lumber, electric light fixtures, finish and silk shade $22. It would ordinarily sell any where from $60 to $80. The design is original to this extent, several lamps were observed and after making eliminations and additions, it was designed to coincide with the rest of the furniture in the room for which it was intended, especially with a table lamp, the description of which was published in this magazine in 1916. It will be noted that the lamp is massive so that it will hug the floor and avoid tipping.

The lamp is made up in four sections as indicated on the drawing. The lower shaft and base are octagon in design. Part A is made from a two inch piece, entirely by hand. Part B is made on the band saw. Part C is planed by hand and requires a great deal of skill in order to plane the octagonal lines perfectly straight. Part D is made on the lathe and offers a good exercise in wood turning. C and D are built up in two pieces and glued together, but before gluing a groove one-fourth by one-half inch is made thru the center of each piece, which when glued together forms a hole one-half inch square. This is to receive the wire. Please note drawing. The holes in A and B are drilled with a half inch bit. A is fastened to B by means of screws and glue. B is fastened to C with a dowel joint, C and D are mortised together, as indicated.

Birch wood was used thruout. Precaution must be taken in gluing up the shaft in order to get the holes in a line. A three-eighths inch hole must be bored on the top or side of base; the exact location is left entirely to the individual. The electric fixtures may be purchased and assembled by the student. Note correlation between design, mechanical drawing, bench work, wood turning and finishing.

The lamp was finished in the following order: One coat of Bridgeport dark standard mahogany penetrating stain, filled with mahogany paste wood filler, one coat of shellac and rubbed with pumice stone and oil; one coat of interior varnish, two coats of flat varnish. The last saves rubbing and insures a soft, rich, satin finish.

A HALL SETTEE.

F. W. Ziegenhagen, Instructor in Woodwork, Boys' Technical High School, Milwaukee, Wis.

The drawing on this page shows the details of a settee which is cedar lined and an interesting problem in advanced cabinet making.

The dimensions of this settee may be changed to suit the individual as far as length is concerned without making it look out of proportion.

A few suggestions are offered. The legs may be veneered, the side and end panels may be either three ply panel or solid panel. If three ply panel is used, the moulding is not needed.

The slots should be scraped and sanded before gluing back and sides together; also care must be taken to the design properly spaced. In the front, back and pieces the rails are mortised and tenoned into the s shown in the section view.

conomy may be practiced in the lining of the box by the cedar ⅜″ thick instead of ½″. The cedar may wed from one inch thickness, thus saving lumber.

e settee may be made of either plain red, or quarter hite oak.

LETTERS FROM READERS

TEACHERS, SUPERINTENDENTS AND EMPLOYMENT.

To The Editor:

I have just read your editorial in the November number of the "Magazine" on "Treatment of Applicants by Superintendents." I agree with everything you said on that matter, but it occurs to me that there is another side to it—the treatment of superintendents by applicants. I have been a participant in both ends of the game, and it seems to me that a lack of courtesy is as common among applicants as it is among school officials. I have known personally of several dozen cases where teachers have applied for a position, and when an offer of the position was made to them, they disregarded the offer, and made no reply to either letters or telegrams. It may be the right of a teacher to apply for any position that strikes his fancy. It is certainly his right to take ample time to consider any offer made to him, and to refuse it if he wishes, but it does seem that professional ethics requires an answer when he receives a favorable reply to his application. The teacher who applies for a position and then fails to reply to the offer of a superintendent has little room for complaint because his photograph is not returned to him.

Jas. R. Coxen,
State Director for Vocational Education,
Cheyenne, Wyo.

October 22, 1919.

DESIGN IN MANUAL TRAINING.

To the Editors:

Industrial Arts is approached in so many ways by the able writers of your Magazine that nearly all ground is covered. I am impressed with the articles now started in the September and October numbers by S. J. Vaughn. The six methods of instruction to boys of the 7th and 8th grades have been classified so it is of direct use to all teachers. It seems to be a just and accurate statement of all methods, giving every method with its defects and its merits.

When a model has been completed by a boy, altho he may not sense its value in its proposition, only its utility may appeal to him. Now proportion is the main attribute of beauty. Without proper proportion no further enrichment can change the initial mistake. Then, if from the beginning he associates himself with models which lose none of their usefulness, and yet show accurate proportion in beautiful form and color, then also indirectly he is becoming a better workman as his interest is greater. Every model should be of the best design thru the whole course; without this advantage his early work is without the incentive of a beautiful object beautifully done, which is the joy of handicraft work. The cabinetmaker of the days of the colonies was obliged to work out by hand his lines of utility to lines of beauty; always seeking the best form; realizing that the better the form the sooner it was sold.

If you look at a Winsor chair it will look beautiful all around. Notice that the size of all turnings, including the rods that support the bent rim of the back; these are larger where strength is necessary. Notice the extension on the back of seat, to support the pressure of the shoulders at the top. Utility commands the line in its every part, and beauty is the result. So a manual training teacher should try to help to the best of his ability with models that appeal to his sense of beauty.

This work cannot be started too soon. It is needed now. For, if the United States in its diversified manufactures, is to compete with other nations for her share in a world's market, she must compete in all points and beauty is not the least of these points.

Charles H. Springer,
Manual Training Teacher,
Providence, R. I.

Beloit, Wis. The evening school is offering courses in machine shop practice, mechanical drawing, shop mathematics, blue print reading, pattern making, architectural drawing, printing, cabinet making and wireless telegraphy Women may study dressmaking, millinery, art needle wo cooking, dietetics, food conservation, telegraphy, and mobile mechanics.

The vocational evening schools of Virginia, M offering courses in machine shop work, printing, gas engine work, mechanic ng, wood foundry work. Unit course and co provided for women.

GENERAL NEWS NOTES.

Wellesley Hills, Mass. The 6-3-3 plan of organization which was introduced in the schools at the beginning of the present school year has made it necessary to make some adjustments in the practical arts courses. Under the direction of Mr. H. H. Coburn, new courses of study have been worked out for the Junior high school to include bench work, wood turning, forge work, patternmaking, and mechanical drawing. The course in the Senior high school is continued as in former years but preparations are being made to introduce an advanced course in machine shop practice. Lathes and machine tools are to be purchased. Plans are also under way for further developing vocational and technical courses in the old high school building which is being used for this type of work.

The School Art League of New York is presenting an extensive series of art meetings and talks to the pupils of the public schools. Beginning some ten years ago in very quiet fashion, the League has gradually organized many forms of practical art work in cooperation with the school system. It now gives art medals in the high schools, maintains several art scholarships, and takes scores of children weekly to the art museums. Its talks are all given by speakers who are familiar with the likes and interests of young people.

The junior members of the League are high school pupils, who pay ten cents a term for their membership and in return get admission tickets for the art meetings. The elementary school pupils are admitted to the museum talks without tickets. They go in crowds and delight to take part in the talks themselves by helping to act the dramatic incidents.

The vocational evening schools of St. Paul, Minn., are offering courses in woodwork, carpentry, cabinet making, pattern making, sheet metal work, machine shop work, gas engine operation, mechanical and architectural drawing, and electricity.

It is also planned to organize a number of part-time vocational classes at the beginning of the second term. The classes are for employed boys and girls between 16 and 18 years of age who wish to continue their education, or who wish to take up some line of work to enlarge their earning power.

All-day vocational classes have been increased by the addition of a beginning class. The classes are held at the Central High School and one grade school, and are open to boys and girls 14 years and older who do not expect to go on to the high school.

The High and Hackley Manual Training School, Muskegon, Mich., has rearranged and adjusted the vocational courses to include provisions for the special training of boys and girls who because of economic conditions, must leave without completing the high school course. To this end there has been introduced a two-year home economics course for girls, a three-year commercial course for both boys and girls, and a two-year industrial course for boys.

Up to the present, three groups of boys have been enrolled in industrial work, the students being distributed among the print, machine and automobile shops. In preparation for this work, it has been decided to increase the shop time allowance for seventh grade pupils from one hour to five hours a week to permit of a tryout period in the various shops. The tryout period permits teachers and pupils to evolve a basis upon which a proper selection of a vocation may be made. In addition to the three hours spent by the pupils in the shops, one hour is devoted to mechanical drawing, one hour to shop mathematics, and one hour to English.

It is planned to follow up the work of the students and to so adjust the students that the proficient ones may be advanced and the remaining ones may be distributed among the regular manual training classes.

The ordnance department of the U. S. Army has established by direction of the Secretary of War a number of training schools where men may be trained for assimilation into the departments of maintenance and repair, testing and production of supplies for which the department is held responsible. The department is an old established branch of the army and is charged with the duty of procuring, distributing and storing for the army and the organized militia, necessary ordnance and ordnance stores, tools, machinery and equipment for the ordnance service and other items of war-like equipment.

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In this direction, there have been established two training schools, one at Camp Holabird, Baltimore, for the motor transport corps and one at Raritan, N. J., for general ordnance training. The first offers four phases of instruction and the latter provides training in twelve vocational courses.

Muscatine, Ia. Under the direction of Mr. Ralph T. Othmer, a continuation school has been established for children who left school and who are required under the new state law to attend class four hours per week. The regular manual training teachers are doing the work which begins after the close of the regular school day.

The Muscatine schools have also opened a school print shop with Mr. I. F. Kreamer as instructor. It is planned soon to open evening classes in vocational subjects.

Quincy, Mass. Evening classes have been established for instruction in blue print reading and drawing for machinists, machine shop practice, sheet metal design, copper smithing, shop mathematics, mold loft work, layout work for electricians, and ship plumbing.

Beaumont, Tex. Under a new arrangement, manual training and industrial education will be offered in the elementary schools. One period of forty minutes a day is given to sewing in the sixth grade and an equal amount of time to work in the seventh grade. Benchwork and mechanical drawing will be taught for forty minutes each day in the sixth and seventh grades.

It is further provided that the new high school when completed shall offer courses in machine shop practice, carpentry, automobile repairing, electrical wiring, salesmanship, advertising and commercial subjects.

Elyria, O. The evening schools offer instruction in mechanical drawing, wood working, pattern making, oxy-acetylene welding, automobile construction and repair, shop mathematics, English and Spanish.

The Essex County Arts Association of New Jersey held its general meeting October 29th, at Newark, N. J. Mr. Robert O. Beebe discussed the "Trend of Vocational Education," and Maj. Fred P. Reagle described "Observations on Reconstruction in the Army."

Ora D. Strange acted as chairman of the fine arts section, Meta Anderson of the special class, Bess M. Crisman of the domestic science and Charles H. Kennington of the industrial arts section.

Handmade jewelry, other metal work, baskets, trays and other articles made by patients at Muirdale Sanitarium and at Columbia Hospital, Milwaukee, as a part of curative treatment, formed an interesting part of the public health exhibit which was featured at the annual convention of the Wisconsin Federation of Women's Clubs at Beloit, Wis., during the latter part of October. The exhibit was of special interest because of the establishment by the last legislature of a state department of occupational therapy and the passage of a law under which supervised work of this character will become a part of the treatment in every county tuberculosis sanitarium of the state.

The Iowa State College at Ames, has established a course in manual training, trades and industries for men with technical training who desire to become teachers of industrial subjects. The course offers the necessary technical and academic training to prepare trade men for teaching positions.

A cooperative vocational course has been introduced in the high school of San Antonio, Tex., under the direction of a trained instructor. Under the plan, students may select any line of vocational work which they will pursue in school. Practical experience in the line selected will be provided thru outside employment with business and industrial firms.

Aberdeen, Wash. Courses in automobile repairing and home management have been introduced in the high school this year.

A course in gas engine repairing has been added at the evening school, Rock Island, Ill.

Secretary Glass of the United States Treasury Department has recommended that a further appropriation of $20,000,000 be given to the Federal Board for Vocational Education in order that it may complete the purposes of the vocational law in reeducating disabled soldiers and sailors.

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The State Board of Vocational Education of North Carolina has completed the organization of its work and the assignment of the staff for vocational work. The program provides for agricultural, home economics, and trade and industrial education. The State College of Agriculture has been designated as the teacher-training institution for both agriculture and the trades and industries for the white race; The North Carolina College for Women, teachers of home economics for the white race; A. & T. College will train teachers of agriculture for the colored race and the Slater Normal and Industrial College, teachers of vocational home economics of the colored race.

The course in home economics requires that those taking the course shall devote a definite amount of time daily to a broad course, including all subjects pertaining to the efficient management of the home. The work will be under the direction of Miss Edna F. Coith.

In the trades and industries, it is planned to offer short unit courses including shop and mill mathematics, for the benefit of certain groups of workmen who are in need of a broader knowledge of their industry. Mr. Geo. W. Coggin of South Carolina will direct the trade and industrial work and Mr. F. T. Shelby of Miami, O., will have direct charge of the teacher-training work.

The trade schools of Boston opened with a large registration of students and a marked increase in numbers of students. The schools are open to all students over 17 years of age.

Woonsocket, R. I. The Harris Industrial School opened the evening school season with classes in woodwork and mechanical drawing. The former is to be conducted along three distinct lines, namely, furniture and cabinet construction, elementary carpentry, and wood turning.

The work in mechanical drawing will cover four phases, namely, drawing reading, perspective and orthographic sketching; inking, tracing and blueprinting; theoretical constructions, intersections and development drawing; tool and machine design.

The Vocational Daily is the title of a school paper just issued by the Crockett Vocational High School at Memphis, Tenn.

The Waltham, Mass., evening vocational school offers courses in machine shop practice, mechanical drawing, wood turning, pattern making, electrical work, blue print reading and shop mathematics.

A complete printing equipment has been installed in the Manual Training Department at Mitchell, S. D., in connection with the introduction of a printing course.

The Manual Training students of Woodward High School, Toledo, O., during the past year made articles of wood in the shops which brought in proceeds amounting to $49. The boys turned out 286 handles, twelve footstools, 150 oak blocks for card indexes and fifty flag sticks.

Articles for which the students received no pay were 3,000 bedside tables, fifty refugee chairs and fifty sock-stretchers, besides wheels, mallets, file handles, book shelves, tables and playhouses.

St. Paul, Minn. Free evening classes in vocational courses have been established at the Madison, Lafayette, Monroe, Lincoln, Johnson, Mechanic Arts and Humboldt schools. Vocational courses in carpentry, sheet metal, cabinet making, pattern making, machine shop, gas engine, electricity, mechanical and architectural drawing have been established.

Fifty disabled soldiers have been placed in training at the University of Arizona by the District Vocational Office at San Francisco, Cal. The men range in ages from 16 to 41 and their disabilities from those troubles contracted in this country to those contracted in overseas service. Most of the men have entered upon the regular courses but a few have selected automobile mechanics.

The evening vocational school at Marion, Ind., is offering courses in machine drafting, motor operation, shop mathematics, metal lathe work, printing, bookkeeping, typewriting, stenography and commercial law.

A gas engine class has been successfully conducted at Minot, N. D. The students install machinery and make repairs on cars which are supplied to them for study.

Astoria, Ill. The board has installed a complete electrical equipment in the domestic science department.

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The city council of Kaukauna, Wis., has appropriated $10,000 for the erection of a vocational school.

The department of domestic science at Eau Claire, Wis., has enrolled 67 new students. This is an increase of two hundred per cent over last year's attendance. The manual training department with 36 new students, has an increase of 75 per cent.

The Diman Vocational School, Fall River, Mass., is offering courses for boys who are of a mechanical turn of mind and who desire to prepare for early entry into an industrial occupation. Regular trade training is offered and boys are assisted in their efforts to become skilled tradesmen.

The courses for the present year include cabinet making and shop carpentry, pattern making, painting, sign wiring, interior decorating and wood finishing. In addition to the shopwork, training is given in academic subjects having a bearing on the course studied.

A course in diet cooking is being offered at the Vocational School, Holyoke, Mass., in connection with the work in home economics. The course is being conducted in addition to the work in home nursing which has been successfully carried on for several years. The school last year was able to supply forty nurses for the "Flu" emergency and received more applications for help than it could possibly fill. The supplementary course makes the work more complete and more valuable in case of a similar emergency.

Supt. P. W. Horn of Houston, Tex., is planning the establishment of part-time schools for employed children. It is planned to establish schools for apprentices of the railroad, the employes of the textile mills and also employes in the department stores.

Watch making and repairing has been added to the course of study at the Waltham high school, Waltham, Mass.

Manual training and art education were prominent topics of discussion at the North Wisconsin Teachers' Association, which met in October at Ashland. Miss Bonnie E. Snow spoke before the general session on Art in the Grades and Mr. William Ostrander of Hurley discussed Manual Arts before the sectional meeting of teachers of special subjects.

Three Rivers, Mich. The manual training department has found lumber so scarce and expensive that it has purchased its supplies for the current year direct from the mills and is saving from $80 to $100 per thousand feet. The department, which is under the directioin of Mr. Emery Smith, is using in the shop classes such lumber from the mills which is dry enough for immediate manufacturing and is storing and air drying the remainder of its purchase.

The department has recently been increased by the organization of a class in architectural drawing.

Part-time classes have been organized in Keokuk, Ia., under the direction of Mr. R. L. Wilson, supervisor of manual training. The classes are conducted from 4 to 5 P. M. four days a week and the instruction consists of unit courses in prevocational shop work.

Vocational education for disabled soldiers at the University of Wisconsin is to be limited this year to residents of the state and to men enrolled in the University last year under a new arrangement with the Federal Board for Vocational Education.

It has been found that other states are following the example set by Wisconsin in training the soldiers and they are now offering to take care of their own service men so that it has been possible to send the men to their respective states.

The University reports that one hundred service men have enrolled to date. These are distributed among the departments of agriculture, commerce, engineering, letters and science, pharmacy, law, journalism, pre-medic, and medicine.

The Junior High School, recently established at Washington, D. C., offers a course in manual training which may be elected as a major or minor subject. Students who take the work as a major subject, will be able to cover more ground than was formerly possible and the work offered will be diversified in character.

Franklin, Ind. The entire industrial arts course of the high school has been reorganized under the direction of Mr.

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D. L. Downing. The course is to be enlarged in scope with the addition of some new equipment.

The manual training department at Washington, Ia., has been equipped with new machinery of high-grade American brands.

The Manual Training Department of the Amesbury High School, Amesbury, Mass., has added upholstery to its woodworking course. Practical work in the upholstering of chairs and footstools is offered. The work is under the direction of Mr. Arthur G. Wood.

Sanford, Me. Under the direction of Mr. Lee Edwards, a four year industrial course has been introduced in the high school. It consists of mechanical drawing, cabinet making and bench woodwork, textile design and cooperative instruction in textile mill work. Sanford is the home of the celebrated Goodall Worsted Company, manufacturers of Palm Beach cloth and of the Sanford Mills who make plush rugs and blanket goods. The prospects of the community are very strong in the direction of the textile industry and the industrial courses must necessarily prepare the students for the work which they are likely to enter. The cooperative textile courses are in charge of Mr. Leslie W. Mackay, a graduate of the Worcester Technical Institute.

The course in machine shop practice at the Technical High School, Springfield, Mass., has been entirely revised for the present year to accord with the new arrangement for three-year courses in the high schools of the city.

The class for this year has selected as the class problem a hand and foot power grinding machine for grinding knives, scissors and similar cutting tools.

The four-cycle gasoline engine, designed and constructed by last year's graduating class, is now being assembled and tested by the postgraduate students. The engine was designed and the patterns were made almost wholly by one student, J. K. Cushman, working in cooperation with the different shop departments and shows some excellent work in planning.

The engine will be effective in giving to the boys the necessary impetus for work in automobile engine building. It should prove the value of a technical course in engine construction as nearly all boys who have specialized in engine work have shown their knowledge in this line to such an advantage that they have been able to secure excellent positions in kindred work in industrial shops.

The Industrial Education Department of Wheeling, W. Va., has extended its scope with the introduction of work in electrical construction, oxy-acetylene welding, blacksmithing, chipping and filing, pattern making, cabinet work, mechanical drawing, sheet metal work and pottery making. The latter includes the full course from the clay moulding to the decorating oven and makes possible the production of a commercial brand of tableware.

The class in farm mechanics of the Winfield, Kans., schools recently completed a greenhouse for the agricultural department. The building which is 20 by 36 feet in size, was built by the students using cement as one of the building materials. The class is composed of the advanced students and the work covers farm carpentry, cement work, gasoline engine work and forging. A total of 339 boys have enrolled this year out of a total of approximately nine hundred students in the Junior-Senior High School.

The Industrial Department at Ionia, Mich., has for the past three years fostered the toy industry during the holiday season. The boys in the grade classes will work this year on toy models of aeroplanes. The toys are being constructed from left over materials from a factory and the designs are made by the pupils under the direction of the instructor.

The advanced classes of the eighth grade and high school have a choice of cabinet making or carpentry. A plan to promote the building industry has been put in operation and the schools will cooperate in the work. A study of carpentry in all its phases is to be undertaken in the advanced woodwork and models will be built of actual, full-size material.

The department is offering a very practical course in drafting and graduates of this course are able to take positions in commercial offices at very acceptable salaries. One student is at present earning a major in architectural draft-

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ing. The entire work of the department is under the direction of Mr. Percy Angove.

An exhibit and demonstration of practical arts was conducted recently at the Berks County, Pennsylvania, Fair. The display of drawing, printing and sewing was so arranged that the different processes and correlation of work might be followed thru the different grades.

Classes from the Reading High School for Girls gave two demonstrations each day in cooking. The pupils prepared articles of food which was served to the visitors and distributed more than eight thousand recipe sheets. There were also demonstrations in sewing each afternoon. This work which was done by boys and girls of the fifth grade was especially interesting and showed the skill which the boys possessed in doing the same work.

Students of the Reading Boys' High School showed their skill in converting rough pieces of wood into various practical articles for souvenir purposes.

The work in pattern making, machine shop work, wood turning and household arts attracted a great deal of attention. Birdhouses constructed in the grades were distributed to visitors. The exhibit was in charge of Mr. J. L. Kreider, Director of Practical Arts, Reading, who also explained features of the work to school people from Canada, Missouri, and cities in Pennsylvania.

The Norwood High School at Norwood, Mass., has added courses in domestic science and industrial arts. The two departments are housed in the new high school building which is considered one of the finest in the state. Both departments are well equipped for their work.

An evening school has been opened in which courses in domestic science, sewing, millinery, home nursing and mechanical drawing are offered.

The Department of History and Economics of the High School of Commerce, Springfield, Mass., is offering an advanced course in geography dealing with foreign trade. One branch of the course deals with American commercial interests in Latin America and the other with American Commercial interests in general. The course is optional to students.

The evening schools of Vincennes, Ind., are offering courses in salesmanship, architecture and building, automobile operation and repair, English, home decoration and house management, typewriting, bookkeeping, stenography, dressmaking, millinery, English for foreigners and cooking. The evening schools have been very successful in the past, the enrollment for the past year having reached 650 persons.

The District Vocational Board of Cincinnati. O., has rendered a report showing that it has been instrumental in placing in training a large number of disabled men. Up to October 9th, the number totaled two hundred and the number is being increased regularly.

The report shows that the vocations to which the men have been assigned are nearly as numerous as the men receiving reeducation. They include practically every kind of work known to men, namely, automobiles, starting and lighting and ignition. Others have chosen clock manufacturing, artificial limb manufacturing, optical work, salesmanship, jewelry engraving, newspaper work, shoe cutting, sign writing, dentistry, oxy-acetylene welding, and other occupations.

In placing these men, training schools have been located in Indiana, Ohio and Kentucky. In every instance, the placement officers have done their work well.

The Dallas Vocational Association has appointed eight members to serve on the executive committee of the association. The committee will shortly appoint a director who is to be at the service of all business and civic institutions which are members of the association and which desire to correlate their own programs with the program and standards of the association. The vocational association aims to assist business institutions in establishing more satisfactory relations between employers and employes, and in increasing the efficiency of the workers.

The Union High School Board of Cincinnati, O., has approved the appointment of ten teachers from the College for Teachers, for cooperative work in the high schools, at a salary of $500 for the year. The teachers selected for this work are those who have entered upon a five-year course at the College, and they will work under the direction of the regular teachers, who will be paid $100 extra for supervisory work.

PERSONAL NEWS.

Mr. P. H. Smiley, who has been in government service with the War Department as special educational representative, has accepted the position of State Director of Vocational Education of Maine. Mr. Smiley was Director of Industrial Arts previous to his entering government service. In his new position, Mr. Smiley will have general supervision of all courses of an industrial and vocational nature, including both state-aided and Smith-Hughes schools.

Mr. I. C. Perkins, who formerly filled the office of Director of Industrial Arts for Maine, has accepted a similar position with the Rhode Island Department of Education.

Mr. Albert R. Lorenger has been appointed instructor of industrial extension work in the evening classes of the Western High School, Detroit, Mich. Mr. Lorenger was formerly director of drawing in the apprentice school of the Ford Motor Company.

Mr. Leroy P. Elliott of Madison, Wis., has been appointed as director of vocational work at Bradley Institute, Peoria, Ill.

Mr. Millard B. King, since 1915 Director of Industrial Education for the Pennsylvania Education Department, has resigned to become supervisor of part-time agents for the Connecticut Mutual Life Insurance Company. Mr. King will make his headquarters at Harrisburg and will continue his present residence at Camp Hill.

Mr. King is a graduate of Dickinson Seminary and of the Pennsylvania State College in electrical engineering. He was made assistant expert in industrial education for the Pennsylvania schools in 1911 and became director in 1915. He is a member of the executive committee of the National Society for Vocational Education and is a special representative of the Federal Board of Vocational Education for the training of army mechanics.

Mr. Ralph W. Polk has been appointed Principal of the Robidoux Polytechnic School, formerly the Robidoux High School. All of the vocational work for boys and girls has been concentrated in this building.

Mr. Elmer W. Christy, director of the industrial department at Cincinnati, O., has been given a year's leave of absence to undertake work in the operation of the education and recreation branch of the war department. Mr. Christy will be located at Camp Pike, Ark., where he will have special charge of the development of courses and the selection and training of teachers for the metal trades.

During Mr. Christy's absence the industrial work is to be divided, with Mr. I. H. Dube in charge of the industrial arts work for the high schools and Mr. John M. Schick directing the work in the elementary schools.

Mr. Homer J. Smith, formerly Vice-Principal of the Boys' Technical High School, Milwaukee, has resigned to become assistant professor in the school of education at the University of Minnesota. Mr. Smith will be associated with Prof. Arthur F. Payne and will hold the title of Specialist in Related Subjects for the Industrial Education Department.

Mr. E. K. Jenkins has been appointed to teach shopwork in the Mechanic Arts Department at Bangor, Me.

Mr. W. F. Eastwood has returned to the manual training work at Attleboro, Mass., after an absence of one year. His work as foreman of a large iron foundry was of much practical benefit to him and the schools will benefit from his recent experiences.

Miss Elizabeth V. Colburn has been appointed Supervisor of Drawing in the grade schools at Minneapolis, Minn.

Miss Ethel Cottrell has been appointed Supervisor of Manual Training at Marine City, Mich., to succeed Leslie J. Edmunds, resigned.

Miss Dorothy Sells of Washington, D. C., has been appointed Assistant Director of Vocational Education in the Smith-Hughes Division of the Texas Department.

Col. Oren M. Meyer has been appointed as vocational and recreational director for the army in the Department of the Northeast. Col. Meyer was for some time in command of the first depot division in France, where he had in charge the training of between 15,000 and 20,000 men for work in army mechanics.

BUYERS' NEWS COLUMN

A NEW MANUAL TRAINING CATALOG.

The Thurston Manual Training Supply Co., of Anoka, Minn., has just issued its Fifth Annual Catalog. The firm rightly designates its line as "unusual and difficult to obtain material." The catalog is devoted to a large line of upholstery supplies, furniture trim, wood finishing materials, art lamp shades, special hardware, furniture, mouldings, and other unusual items.

In addition to these things the firm carries leather and other articles frequently used in the school shops.

Copies of the catalog will be sent on request to any teacher.

FINDING YOUR PENCIL.

The Joseph Dixon Crucible Co., Jersey City, N. J., has issued a pamphlet that will be found of real service to teachers and students of art and mechanical drawing—in fact, all users of pencils. It is a service book in the best sense and includes a clever chart by which the right pencil for any given purpose can be selected.

Copies of the booklet are available without cost to interested readers.

OFFER NEW SLITTING SHEARS.

The Peck, Stow & Wilcox Company of Southington, Conn., has recently placed on the market a new long length rotary slitting shears No. 1039. The shears have demonstrated their accuracy and economy for shops where a large squaring shears is not desirable. The new shears are used for slitting up members from sheets for cornices, gutters, etc., of any width and up to a length of 120 inches. It is claimed for the shears that they will cut straight and true and will not crimp, burr or curl the edges of the sheet.

The slitting is done by rotary cutters mounted on a carriage which travels on a guide. The cutting attachment is connected by a chain which runs over a sprocket at each end of the bed of the shear and is operated by means of a hand crank which moves the cutting head forward or backward. Very little power is required to operate these shears and a ten-foot sheet can be split in less than half a minute.

The cutter head is made of cast steel, the cutters are made of high-grade tempered steel, and are so constructed as to permit one cutter to overlap the other about one-sixteenth of an inch for making a clean cut.

The sheet is held firmly with a clamp and is raised and lowered by means of an eccentric located at one end of shear. When this clamp is forced down on the sheet, there is no possible chance of the sheet moving. The gauge provided is composed of a movable block on each supporting arm and is tightened by means of a thumbscrew on each block; and the gauge arms are graduated. The shear is mounted on heavy cast iron legs and does not have to be bolted to the floor.

ISSUE CATALOG OF PHONOGRAPH PARTS.

The Indiana Phonograph Supply Company of Indianapolis, Ind., has recently issued a complete catalog of phonograph parts and accessories which it is prepared to supply to the school trade and to persons interested in the construction of phonographs.

The catalog contains eighteen pages devoted to motors, tone arms, reproducers and cabinets. In addition, the firm carries a large line of record albums, needles, record cleaners, attachments and miscellaneous hardware which may be had at moderate prices.

Copies of the catalog may be obtained by any school shop.

PERSONAL NEWS NOTES.

Mr. Geo. C. Kershner, head of the Manual Training Department of the Decatur, Ill., high school, has resigned to become Supervisor of Industrial Education at Austin, Tex. The Austin schools have a complete department of industrial education. The courses in the high school include wood working, forge work, sheet metal, automobile repair, mechanical drawing, etc. Prevocational work in these lines is also offered in the junior high school.

Mr. O. E. Hawley has become assistant in the manual training department at Keokuk, Ia. He succeeds Mr. Max Veith.

Mr. Alden B. Hayes has been appointed Director of the Mechanic Arts Department at Bangor, Me., to succeed Mr. B. C. Kent.

Classified Wants

This department is intended to simplify the exchange of wants on the part of our readers and is open to all legitimate announcements. The rate is 25 cents per line, per insertion. Minimum of five lines accepted. An average of seven (7) words constitutes a line.

All wants are subject to approval. Forms close 25th of month preceding issue.

MANUAL TRAINING SUPPLIES.

"Hard-to-Get" Materials—Every Instructor needs our supplies. Nifty pulls and catches, costumer hooks, tray mouldings and handles, copper chest trimmings, wood lamp shades, art glass, tea wagon wheels, sliding casters, dowels, leathers and imitations, all kinds of upholstering materials, etc., etc. We make any style cushion to fit your chair or davenport. Write today for a copy of our latest catalog. Thurston Manual Training Supply Co., Anoka, Minnesota.

SHOP GLUE HEATERS

A safe economical and inexpensive Electric Glue Heater—is what Manual Training Instructors are asking for. One that will hold glue at the correct working temperature without guess-work and one that is portable and easily attached. Our Safety First Electric Glue Heater fulfills all these wants, in two sizes, and at a low cost. With attachment plugs—2 pts. size $5.00. 3 pts. size $6 00. Address, P. M. Spink, 761-4th Ave., Faribault, Minn.

CLOCK WORKS

Clock Movements,—chimes, dials, part of cases in the knock down, blue prints, designs, instructions, in fact, all assistance required by manual training teachers. Write for free booklet today. American Clock Company, Nicetown, Philadelphia, Pa.

MAGNESITE MATERIALS

Keep up with the times.— Get out of the rut. Follow Mr. Worst's suggestion on the new educational feature of artistic and creative magnesite. Central Manual Training Equipment Bureau, 4738 North Artesian Avenue, Chicago, Ill.

CABINET HARDWARE

Special Service—We make it a rule to give special service on Cabinet Hardware for teachers. Send a postal today for our catalog. F. A. Rauch & Co., 410 S. Market St., Chicago, Ill. In one line of business for 37 years.

UPHOLSTERING GOODS

Samples—We will gladly send you Free Samples of our line of upholstering goods on receipt of inquiry. F. A. Rauch & Co., 410 S. Market St., Chicago, Ill. In one line of business for 37 years.

REED AND RAFFIA

Free Samples—We will send you free samples of all our reeds and raffia for school use. Send a postal today to Louis Stoughton Drake, Inc., 33 Everett St., Allston, Mass.

TIRE VULCANIZING

Vulcanizing School. Industrial-Arts Teacher of twenty years experience will teach tire repairing and vulcanizing by mail. Graduate of Goodyear Tire Repair School, Akron, Ohio. Make this a part of your course. Address Spencer C. Stull, Teacher Industrial-Arts, Boys' High School, Frederick, Md.

BASKETRY MATERIALS

Basketry Materials—We have everything for basket making, including reeds, willow, chaircane, Indian splints, ash splints. Louis Stoughton Drake, Inc., 33 Everett St., Allston, Mass.

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Leather—We have a fine line of leather and imitation leather ready for immediate shipment. Write us your wants today. F. A. Rauch & Co., 410 S. Market St., Chicago, Ill. In one line of business for 37 years.

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Better Pictures for Schools—School Art Materials, Statuary, Casts, Cement Garden Furniture for Schools, etc., are only a few of our specialties. Complete information will gladly be sent on request. Warren-Edwards & Co., 434 Center St. Chicago. Ill.

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Free Catalog—If you haven't had our Free Catalog, write today. This will be of special interest to you and will be sent promptly. F. A. Rauch & Co., 410 S. Market St., Chicago, Ill. In one line of business for 37 years.

LUMBER TABLES

"72 Useful Lumber Tables"—The time saver for manual training instructors. Contains 20,736 tabulated answers and with which you can find the price of any board at any price at a glance. Postpaid. Second edition just off the press. Price $1.00. Order now from L. H. Alberty, Winfield, Kans.

CANING MATERIALS

Finest Quality — We have cane, reed, webbing, flat rush, for all kinds of chair caning. Samples and catalogs free. Louis Stoughton Drake, Inc., 33 Everett St., Allston, Mass.

AMERICAN BLACK WALNUT

We make a Specialty of Walnut and other hard woods for Manual Training Work, selling direct to schools. Meek Lumber Co., Peru, Nebraska.

LETTERING TABLET

Spoonbill Pen Lettering Tablet. A brief course in the Science of Show Card Lettering with the famous "Spoonbill Pens". Practical and interesting drills in simple Alphabets. Postpaid, 60c. The Prang Company, 1922 Calumet Ave., Chicago.

LETTERING SHEETS

Better Lettering—is the ambition of every drawing instructor who is genuinely interested in his pupils' work. He knows what good lettering and dimensioning means to a well executed drawing and, likewise, the difficulty in securing this result without devoting an excessive amount of time to practice work. The Thorndike Lettering Sheets eliminate this practice work which is so distasteful to the boys. Send for sample sheets and learn how it is done. Chester L. Thorndike, 297 Bay Street, Springfield, Mass.

BLUE PRINTS

Free Catalog and Sample— Blue Prints of Agricultural, Furniture Making, Mechanical Drawing, Wood Turning, Forge Work, Pattern Making and Whittling Problems. Make your work more practical. Work from blue prints. Schenke Blue Print Co., 1632 Merryman St., Marinette, Wisconsin.

DRAUGHTSMEN ATTENTION!

Draw Dots and Dashes—the new and simple way. Straight and dotted lines without changing pen. Use your own pen. Always ready. No adjusting required. The most simple dot and dash device on the market. Ask your dealer or write us. The Rapid Dot & Dash Device Co., 242 Lakeshore Blvd., Oakland, California.

DRAFTING SUPPLIES

Catalog G.—New illustrated catalog on Drawing Stands and Drafting Tables. Suitable for Schools, Drawing Classes, Artists, Draftsmen and Engineers. The Washburn Shops of the Worcester Polytechnic Institute, Worcester, Mass.

ENGINES

Engines ⅛ H. P. and up. Blue Prints and Castings. We mail postpaid for $1, 3 sets (14 sheets) detailed and assembled Blue Prints of ⅛ H. P. Boiler and Engine, ¼ H. P. Horizontal Steam Engine and ½ H. P. Vertical 2 cycle Gasoline Engine. Get the Blue Prints now and Castings later. Circulars and particulars for stamp, or send for our Big Catalogue on Small Steam Engines and Boilers, Gas and Gasoline Engines, ⅛ H. P. and up. Tanks, Pumps, Gears and Model Makers' Supplies. Catalogue sent postpaid for 15 cents (coin preferred) or stamps. Refunded on first order. 192 Pages, over 200 Illustrations. Modern Engine & Supply Co.. 3rd Floor, Monadnock Block, Chicago, Ill.

TYPE

Manufacturers of Metal Type. Wood Type, Reglet, Brass Rule and Printers' Supplies. In no trust or combination. Empire Type Foundry, Buffalo, N. Y., Delevan, N. Y.

FOR SALE

For Sale—Library of Manual Training reference books, blue prints and tracings. Also two sets of drawing instruments. Write for bargain prices. H. E. Kirby, 707—5th St., N. Fargo, N. D.